THE EFFECTS OF LEARNING-STYLES AWARENESS AND KNOWLEDGE OF INSTRUCTIONAL MODELS ON THE STUDY HABITS OF COLLEGE STUDENTS AT RISK FOR ACADEMIC FAILURE

By

AINSLEY CARRY

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF EDUCATION

UNIVERSITY OF FLORIDA

1998

Copyright 1998

by

Ainsley Carry

This dissertation is dedicated to my mother. All that I am and all that I ever hope to be I owe to her love.

ACKNOWLEDGMENTS

First, I would like to thank God for her guidance and grace in my life. Without her none of this would have been possible. I would also like to thank my family. My mother has supported and believed in me every step of the way. My brothers (Amir, Andrew, Anthony, and their families) have been a source of inspiration for me throughout my years of education. I love them all dearly. I must also thank Tee and Sasha for their unconditional love, never-ending support, and tremendous courage; God Bless them both.

I would like to thank my dissertation committee chair, Dr. Linda Behar-Horenstein; without her commitment I would not have been able to complete this journey. I owe a great deal of thanks to Dr. Robert Sherman for his hard work and dedication. I would like to thank Kirstine Rogers and Deanne Chandler for their editorial assistance. And I would also like to thank my employers for their inspiration and consideration during this journey.

TABLE OF CONTENTS

ACKNOWLEDGMENTS....................................iv

ABSTRACT...viii

INTRODUCTION.......................................1
- Statement of the Problem..........................4
- Purpose...5
- Research Questions................................8
- Methodological Approach...........................9
- Significance of the Study.........................10
- Limitations of the Study..........................11
- Definition of Terms...............................13

LITERATURE REVIEW..................................16
- Academic Characteristics of Students At Risk......16
- Locus of Control..................................20
- Study Habits......................................27
- Learning Styles...................................30
    - Impact on Academic Performance................32
    - Impact on Quality of Instruction..............41
- Models of Teaching................................46
    - Family of Models..............................46
    - Impact on Study Habits........................48
    - Impact on Quality of Instruction..............51
- Summary...54

METHODOLOGY..56
- Research Design...................................56
- Description of Participants.......................57
- Instrumentation...................................62
- Case Study Protocol...............................65
    - Gaining Access................................66
    - Selecting Participants........................66
    - Initiating the Study..........................66
    - Protocol......................................67
    - Procedures....................................70
- Procedures for Data Collection....................71
- Data Analysis.....................................74

Validity and Reliability.............................75
Researcher Bias......................................79

PRESENTATION OF DATA.....................................84
Case 1: Dan..85
Findings Related to Participant's Learning Styles......................................86
Findings Related to Instructor's Model of Teaching....................................94
Findings Related to Participant's Locus of Control.....................................98
Summary...101

Case 2: Jen...102
Findings Related to Participant's Learning Styles.....................................104
Findings Related to Instructor's Model of Teaching...................................113
Findings Related to Participant's Locus of Control....................................116
Summary...119

Case 3: Mike..120
Findings Related to Participant's Learning Styles.....................................122
Findings Related to Instructor's Model of Teaching...................................131
Findings Related to Participant's Locus of Control....................................133
Summary...137

Case 4: Pat...138
Findings Related to Participant's Learning Styles.....................................139
Findings Related to Instructor's Model of Teaching...................................148
Findings Related to Participant's Locus of Control....................................151
Summary...155

Case 5: Tony..156
Findings Related to Participant's Learning Styles.....................................157
Findings Related to Instructor's Model of Teaching...................................165
Findings Related to Participant's Locus of Control....................................170
Summary...172

DISCUSSION..174
Findings Related to Research Questions..............175
Implications of the Study...........................180
Recommendations.....................................182
Summary...186

APPENDIX A Family of Models.............................189
APPENDIX B Multidimensional-Multiattributional Causality Scale.......................190
APPENDIX C Learning-style journal.......................193
APPENDIX D Pre-PEPS grid................................195
APPENDIX E Productivity Environmental Preference Survey...............................197
APPENDIX F Dan's PEPS results...........................200
APPENDIX G Jen's PEPS results...........................202
APPENDIX H Mike's PEPS results..........................204
APPENDIX I Pat's PEPS results...........................206
APPENDIX J Tony's PEPS results..........................208

REFERENCE...209

BIOGRAPHICAL SKETCH.....................................217

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Education

THE EFFECTS OF LEARNING-STYLES AWARENESS AND KNOWLEDGE OF INSTRUCTIONAL MODELS ON THE STUDY HABITS OF COLLEGE STUDENTS AT RISK FOR ACADEMIC FAILURE

By

Ainsley Carry

December 1998

Chairperson: Dr. Linda Behar-Horenstein
Major Department: Department of Educational Leadership

The purpose of this study was to describe how learning-styles awareness and knowledge of teachers' models affected the study habits of college students at risk for academic failure. For 10 weeks 5 students met with the researcher on a weekly basis. They recorded their experiences in experimenting with a variety of learning styles, completed both learning-styles and locus-of-control assessments, and discussed their learning-styles preferences and teaching models. The data were collected and analyzed using a multiple-case-study approach. The findings from this study showed that students were able to change some of their study habits as their awareness of their own learning styles and understanding of how university instructors used teaching models was enhanced.

INTRODUCTION

College-student retention and attrition is a major concern for higher-education administrators (Astin, 1975; Pascarella & Terenzini, 1991, Terenzini, 1993; Tinto,1987). An American College Test (ACT) survey (American college testing program, 1996) revealed that the dropout rate for first-year college students was at an all time high; the national freshman-to-sophomore dropout rate was 26.9%. Previously the highest dropout rate reported in 1983 was 24.5% (American College Testing Program, 1996). In addition, the national four-year graduation rate is just as alarming. In 1996 the National Center for Educational Statistics (NCES, 1996) reported that only 57.1% of students entering college in 1990 completed a bachelor's degree. Astin (1975), Pascarella (1982), and Terenzini (1993) have suggested that preventing students from dropping out may be one of the biggest challenges facing American institutions of higher education.

Researchers have reported that students drop out of college for a number of reasons. A lack of financial resources, personal and family problems, an inability to adjust socially, and academic difficulties are among the factors that contribute to attrition (Astin, 1975; Pascarella & Terenzini, 1991; Terenzini, 1993; Tinto,1987). Gordon (1992) suggested that students who are considered to be at risk academically often enter college with insufficient basic academic skills or are unable to adjust to the intellectual demands of higher education. Others have reported that students at risk of academic failure often lack basic academic skills in reading, writing, or arithmetic (Astin, 1975; Larose & Roy, 1991; Schumacker, Sayler, & Bembry, 1995; Terenzini, 1993). First-year college students tend to be particularly vulnerable to experiencing academic failure. Many researchers have observed that these students often lack basic study and organizational skills such as time management, test taking, note taking, and self-regulated learning (Dunn, 1995; Hannafin, 1991; Hodgkinson, 1983; McCaig, 1993; Nisbet, Ruble & Schurr, 1982; Noel, Levitz, & Saluri, 1985; Pascarella & Terenzini, 1991; Roueche & Roueche, 1994; Weinstein & Underwood, 1985).

One intervention that has been successful in improving student retention is the college-study-skills course (Abrams & Jernigan, 1984; Cone, 1991; Kulik,

Kulik, and Shwalb, 1983; McCaig, 1993; Reglin, 1990; Robyak & Downey, 1979; Roueche & Roueche, 1994; Silverman, 1990; Simmons, Wallins, & George, 1995; Tarpey & Harris, 1979). Cone (1991) reported that the freshman-to-sophomore retention rate increased from 46% to 62% when students enrolled in a college study skills course. He also discovered that 53% of the students at risk for retention who were enrolled a in study skills course successfully completed their sophomore year, while only 7% of the students who did not take such course work pursued studies beyond the sophomore year. Given the vital role that college-study-skills courses can play in the retention of college students at risk of academic failure, it seems imperative that these courses are well conceptualized.

Another approach to improving student retention may be to assist students in developing more effective study habits. Several researchers have found that when students adopted more effective study habits, improvements in comprehension and academic performance usually occurred (Balajthy & Weisberg, 1990; Elliott, Godshall, Shrout, & Witty, 1990; Haslam & Brown, 1968; King, 1992; Nist, Simpson, Olejnik, & Mealey, 1991; Peterson, 1992; Ruddell & Boyle, 1989). For example, Nist et al. found that when students were taught study skills such as word meaning, organization, and executive control processes, their test scores increased. They wrote, "tactics relying on executive control processes, PLAE [planning, listing, activating, evaluating], and word meaning were consistently and statistically detectably associated with better test performance" (Nist, et al., p. 708, 1991).

Statement of the Problem

In some cases, college-study-skills courses have proven to be successful in assisting students who were at risk for academic failure. Explicitly, studies have shown that these particular courses helped students improve their grade-point-averages. However, the authors of these studies did not discuss if there was a relationship between students' experience in study-skills courses and their study habits. For example, as students' academic performances increase, was there a concomitant change in their study habits?

Understanding how students' study habits may change as a result of study-skills training remains an unanswered question. It has been documented that grade-point-averages and other academic indicators may improve when students participate in study-skills courses. However, the literature does not illustrate how or if students' behaviors and habits may have changed as a result of their involvement in academic-improvement programs.

Purpose

The overall purpose of this study was to describe how an awareness of learning styles and instructors' models of teaching effected the study habits of students at risk for academic failure. Of particular interest to the researcher was to understand if such an awareness may cause students to change the way they study. A secondary purpose was to describe if students' awareness of their learning styles and instructors' models of teaching changed their locus of control from external to internal.

There have been several quantitative studies about the utility of learning-styles research in higher education (Claxton & Murrell, 1987; Grimes, 1995; Nelson, Dunn, Griggs, Primavera, Fitzpatrick, Bacilious, Miller, 1993; O'Brien & Thompson, 1994; Wratcher, 1991). Many of these studies revealed that matching students' learning styles with appropriate study habits had the potential to improve students' academic performances and change how they studied. For example, Nelson et al. concluded that "those participants who were provided with instructions for studying congruent with their individual learning styles were retained at a higher rate than those in the control group" (p. 368).

Several educational researchers have suggested that the application of learning-styles research may be beneficial to students' successful academic performance. Clark-Thayer (1987), Claxton and Murrell (1987), Dixon (1985), Fleming and Mills (1992), Weinstein & Underwood (1985), and Wratcher (1991) discovered that when students became more knowledgeable about their learning styles, they became empowered. Students reported that they began to feel a greater sense of control and responsibility for their academic situation. In addition, researchers also discovered that when students learned how to use their learning-styles characteristics to their advantage, academic performance improved (Clark-Thayer, 1987; Claxton & Murrell, 1987; Dixon, 1985; Fleming & Mills, 1992; Miller, Alway, & McKinley, 1987; Wratcher, 1991; Weinstein, 1985).

However, few studies have examined how students' awareness of their own learning styles and teaching models might influence the nature of their study habits using qualitative methods of inquiry.

Flemings and Mills (1992) stated that the next development in learning-styles research should include "a longitudinal study of the effects of students' identifying their modal preferences and adopting new strategies" (p.146). They further noted that "there is a growing body of anecdotal information, but it would be helpful to have a more focused study of the detailed effects on some students' modification of their learning-strategy" (p. 146).

Fleming and Mills (1992) claimed that personalized knowledge of learning-styles preferences helped "empower students to reflect on their own sensory preferences and modify their study methods accordingly" (p. 137). Based on their observations, they concluded that "the most realistic approach to the accommodation of learning styles in teaching programs should involve empowering students through knowledge of their own learning styles to adjust their learning behavior to the learning programs they encounter" (p.138).

Research has also suggested that when students acquire knowledge of their particular learning styles and their professors' teaching models, their study habits are likely to improve. Teaching models are a conceptual framework of activities that teachers use to create lessons that are rational, logical and designed to accomplish specific educational objectives (Joyce & Weil, 1996). Clark-Thayer (1987) noted:

> When students are able to take more responsibility for their learning, they are able to gain a greater feeling of control. They no longer need to say 'I don't know where to begin!'; instead they have a collection of strategies from which to choose in order to meet their learning goals. The choices, the responsibility, the control becomes theirs. (p.2)

Through interviews and classroom observations, the researcher encouraged students to use their understanding of teaching models to improve their study habits and make changes in the way they prepare for class, take notes and examinations, or listen to lectures. Joyce and Weil (1996) referred to this approach as "learner flexibility training." By helping students become aware of teaching methods, they may develop more effective study skills and habits (e.g., note-taking skills and understanding lectures). Support for this technique was offered by Joyce and Weil, who recommended this approach for assisting marginal students. They suggested that this approach involved teaching "learners to relate to a wide spectrum of learning environments" (Joyce & Weil, 1996, p. 395). Teaching students to relate to an appropriate variety of learning environments means teaching them to be aware of and understand their instructors' teaching methods and adjust their study habits accordingly.

Research Questions

The questions investigated in this study are:

1. How did students at risk for academic failure incorporate an awareness of their learning styles into their study habits?

2. How did students at risk for academic failure incorporate an understanding of teaching models into their study habits?

3. How does a personal awareness of learning styles effect participants' academic locus of control?

4. How does an understanding of teaching models effect participants' academic locus of control?

Methodological Approach

This study was conducted using a descriptive, case-study approach. A thick, rich description documented how participants' knowledge about their learning styles and their instructors' teaching models influenced their use of study habits. The students' awareness of learning-styles was analyzed by examining the results of a published learning-styles inventory, the Productivity Environmental Preference Survey (PEPS), and a journal in which they described how their study habits changed as a result of becoming aware of their learning styles. Understanding how an awareness of instructor's teaching models influenced their use of study habits was described by students through interviews, journals, and the researcher's observation of instructors' models of teaching in selected courses.

Only candidates who exhibited an external locus of control, as measured by the Multidimensional Multiattributional Causality Scale (MMCS), were invited to participate in the study. The researcher and the participants met weekly to discuss students' journal entries and how they believed their study habits may have changed over a 10-week period. The researcher conducted this investigation in the context of a participant observer.

Significance of the Study

This study should be significant for both college administrators and students. Understanding how students' incorporate an awareness of their own learning styles and teaching models into their repertoire of study skills may be valuable information in diminishing college-student attrition. Findings from this study may provide college administrators with guidelines to develop textbooks for college-study-skills courses and courses aimed at retaining students who are at risk for academic failure. This study may also offer suggestions for how instructors can teach students about their learning styles. Moreover, this study might also help college instructors understand the benefits of matching teaching models with students' preferred learning styles. Finally, on behalf of students involved in the study, it is hoped that knowledge of their particular learning styles and teaching models may assist them in improving their study habits.

Limitations of the Study

The limitations of this study include the length of the study, the selection of participants, locus-of-control findings, and the threat of researcher bias.

The duration of the study was one academic semester. While some participants may report superficial changes in study habits and locus of control, for others changes in such habits may take years. Therefore, it was recognized that the depth and breadth of the findings in this study may have been influenced by its duration.

Another limitation of this study is the purposive selection of participants. Fraenkel and Wallen (1996) indicated that researchers select a purposive sample "based on previous knowledge of a population and the specific purpose of the research, investigators use personal judgment to select a sample" (p. 100). Participants selected were at risk for academic failure, had an external locus of control, and were willing to participate in a semester-long examination of their learning styles. If another student population (e.g., athletes, non-traditional aged students, international students, or students with learning disabilities) were selected, the results of the study might have been quite different. Another selection limitation may have resulted from the participants' motivation and their interest in improving their study habits. This was evident in their willingness to participate through the duration of the study. Therefore, it is acknowledged that their interest to improve their study habits may have contributed to the findings. The results may have been different if students who were unmotivated to improve their study habits had participated in the study.

A final limitation of this study relates to the locus of control. A locus-of-control instrument (i.e., Multidimensional Multiattributional Causality Scale) was used to assess participants' externality versus internality for the purposes of identifying potential participants. However, this instrument was not used as a post-test measure of locus of control. Instead, qualitative evidence (journal entries and interviews) were used to determine any changes in the participants' locus of control. This methodology was more consistent with the framework of qualitative analysis.

Another limitation of this study may be the researcher's bias. It is important to note that the researcher's interpretation of the data may be biased by his belief that learning style research can positively effect students' study habits and locus of control. To guard against misinterpretations of the data, several steps were taken to reduce the effects of researcher bias. First, a strict protocol guided the research process from selection of participants to data collection and analysis. Second, a graduate student conducted a dependability audit on a sample of the data to corroborate the themes and patterns that were identified. Finally, the researcher relied on extensive use of participants' statements (i.e., direct quotes and journal entries) to present the data.

Definition of Terms

Academically at risk refers to first-year students who have passed less than 12 credit hours and have a grade-point average below 1.5 after their first semester in college.

Academic failure occurs when a student does not successfully meet the minimum requirements for a given course or series of courses.

Academic performance refers to the outcomes that are the results of students' efforts in the classroom.

Attrition is the percentage of college students that discontinue their college enrollment.

Learning strategy includes any ideas or behaviors that help students acquire new information in such a way that the new information is integrated with their existing knowledge.

Learning styles are students' consistent ways of responding to and using stimuli in the context of learning. Students usually show a distinct preference for the modality in which they learn best, either auditory, visual, or kinesthetic.

Locus of control refers to the degree to which persons expect that an outcome of their behavior is contingent upon their own behavior versus a function of chance, luck, fate, or under the control of powerful others (Rotter, 1966).

Multidimensional Multiattributional Causality Scale (MMCS) is an instrument that is used to assess students' internal versus external academic locus of control.

The Productivity Environmental Preference Survey (PEPS) is an instrument that is used to identify how adults prefer to function, learn, concentrate, and perform in their occupational or educational activities. The instrument assesses the following needs: environmental, emotional, sociological, and physical.

Retention is the percentage of college students who continue their college enrollment in comparison to those who discontinue.

Study habits can be described as students' effective management of skills such as: time management, test preparation, organization, note-taking, listening, concentration, and reading.

Teaching models (models of teaching) are conceptual frameworks that teachers use to plan instruction and encourage specific educational outcomes.

LITERATURE REVIEW

The purpose of this study was to describe how students at risk for academic failure incorporated into their study habits an awareness of their particular learning styles and an understanding of their instructors' teaching models. The purpose of this chapter is to provide an overview of the following topics: (a) academic characteristics of students at risk, (b) locus of control, (c) study habits, (d) learning styles, and (e) models of teaching.

Academic Characteristics of Students At Risk

Although many factors have served to characterize these students (e.g., demographic, socioeconomic, cognitive, and non-cognitive) this study focused primarily on their ability to use appropriate study habits.

Academic-performance variables that characterize college students at risk for academic failure include standardized test scores and grade-point averages. Nisbet, Ruble, and Schurr (1982) and Larose and Roy (1991) examined the use of standardized tests (i.e., MBTI, ACT, and SAT) as predicative measures of students' academic performances. Their studies revealed that these measures often served to "increase the predictability of students who were likely to have academic difficulty in the college environment" (Nisbet et al., 1982, p. 235).

In addition, the literature also recognized weak academic backgrounds as a characteristic of some college students who were labeled as at risk of academic failure. These students often lacked basic skills in reading, writing, and arithmetic. Educational researchers have noted that these skills are essential for academic success in college (Dunn, 1995; Gordon, 1992; Larose & Roy, 1991; Nisbet et al., 1982; Schumacker, Sayler, & Bembry, 1995; Weinstein, 1994; White & Sedlacek, 1986). Personality characteristics often times are indicators of poor academic performance. These characteristics include lack of motivation, low self-esteem, unclear educational goals, poor social-integration skills, reluctance to seek assistance, an unclear sense of vocational purpose, poor attitude, and high levels of anxiety. Academic-skills problems that are an indicator of poor academic performance include poor conceptual skills, verbal passiveness, ineffective study methods, problems with concentration, poor time management, and an external academic locus of control

(DeBoer, 1983; Kanoy & Wester, 1989; Larose & Roy, 1991; Nist et al., 1990; Pascerella et al., 1996; Perry et al., 1993; Schumacker et al., 1995; Weinstein, 1994; White & Sedlacek, 1986).

However, unlike standardized test-score results, academic-skills characteristics are so elusive that educators often find them difficult to observe or measure. Nist, Mealey, Simpson, and Richard(1990) and Weinstein (1994) used the Learning and Study Strategies Inventory (LASSI) to identify these characteristics. They administered the LASSI to several college students who were identified as at risk for academic failure. The LASSI is a diagnostic, prescriptive, self-report measure of academic skills that focused on thoughts and behaviors that can be changed through educational interventions. The assessment provides standardized scores for ten scales: Attitude, Motivation, Time Management, Anxiety, Concentration, Information Processing, Selecting the Main Idea, Study Aids, Self Testing, and Test Strategies.

Nist et al. (1990) used the LASSI to measure the cognitive growth of regularly admitted and developmental students. Their study examined 71 regularly admitted students and 168 developmental-studies students. For eight weeks students received instruction on how to select and use a variety of strategies via a study-skills course. Pre- and post-test scores on the LASSI revealed that the regularly admitted students showed significant growth on all 10 sub-scales. The developmental-studies students showed growth on eight of the sub-scales; these students evidenced no growth for the attitude and motivation sub-scales. Both groups experienced significant growth between the LASSI pre- and post-test.

Schumacker et al. (1995) found the LASSI to be useful in terms of predicting academic performance. They examined the relationship between the LASSI sub-scales and academic achievement in early college-entrance programs. In addition to the LASSI sub-scale scores, SAT scores and college grade-point averages were obtained on each participant at the end of the semester. The sample consisted of 156 first-semester college students. Students were divided into two groups, academically successful (GPA 2.50 or better) or unsuccessful. The results of this study revealed that this sample of at-risk students performed below the 50th percentile on the following three LASSI sub-scales: time management (37%); selecting the main idea (35%); and self-testing (33%). Academically successful students scored above the 75th percentile on these particular sub-scales. The authors suggested that "if students score low on these LASSI sub-scales, they should be provided help by academic program staff during their first college semester of course work" (Schumacker et al., 1995, p. 129).

The results of the Nist et al. (1990) and Schumacker et al. (1995) studies served to identify some of the academic variables (e.g., motivation, attitude, time management, test anxiety, concentration, test strategies) that characterize college students at risk of academic failure.

Locus of Control

"The role of reinforcement, reward, or gratification is universally recognized by students of human nature as a crucial one in the acquisition and performance of skills and knowledge" (Rotter, 1966, p. 171). Rotter's (1966) concept of locus of control referred to the degree to which persons expected that a reinforcement or an outcome of their behavior was contingent on their own behavior or personal characteristics; versus the degree to which persons expected that the reinforcement or outcome was a function of chance, luck, or fate or was under the control of powerful others (Rotter, 1990). Rotter (1966) differentiated between internal and external locus of control. He hypothesized that people with a strong sense of internal control tended to believe that they were responsible for what happened to them while more externally directed individuals tended to think that their destiny was in the hands of powerful others, luck or fate.

The link between students' locus of control and study habits was investigated in this study. A number of studies have examined the relationship between locus of control and academic achievement (Crandall, Katkovasky, & Preston, 1962; Grimes, 1995; Kanoy & Wester, 1989; Wilhite, 1990), but few have documented the effect this typology had on students' study habits. The general consensus has been that "internal scorers, those who attribute the source of rewards and punishment in their lives to themselves, had higher grades than external scorers, those who attributed the sources of reward and punishment to luck, fate, chance, or powerful others" (Crandall, et al., 1962, p.100).

However, the aspects of locus of control that are important for this study are their effects on students' study habits. Cone (1991), El-Hindi and Childers(1996), Sherman (1985), and Watkins (1987) have commented on the relationship between locus of control and study habits. In general their findings concluded that students who possessed a more internal locus of control had better study habits than students who possessed an external locus of control. Sherman said, "positive effects accrue when learners recognize the extent to which they can control academic consequences.... Learners who perceive themselves as potentially being able to exercise control over learning [internal locus of control] are more likely actually to attempt effective learning skills" (Sherman, 1985, p.94).

Cone (1991) conducted an examination of locus-of-control measures for two groups of students who initially scored externally on a locus-of-control measure. He hypothesized that effective study skills courses should not only serve to enhance GPA, but also help students take personal responsibility for their academic success (Cone, 1991). The data from his study revealed that "mean GPA was significantly higher than predicted and that higher academic achievement seems to be associated with a shift in locus of control primarily associated with those students who began the semester as external scorers and were assigned to the study course " (Cone, 1991, p. 1212). Improved academic performance was associated with students who shifted from an external to an internal locus of control. Cone (1991) concluded that "if a college study skills and adjustment course is effective, it should not only lead to students earning GPAs which are higher than the predicted GPA, but it should also produce systematic changes in locus of control towards greater internality" (p. 1212). It can also be assumed that those students whose GPAs improved may have also improved their study habits. The results of this study supported the notion that students who exhibited an internal locus of control usually practiced more effective study habits and behaviors. These habits usually lead to better academic achievement than their counterparts (i.e., externals).

El-Hindi and Childers (1996) examined the metacognitive awareness and perceived attributions (i.e., locus of control) for academic outcomes of college students at risk for failure. Seventy-eight students at risk for academic failure (GPA below 2.0) were required to enroll in a support course (i.e., study-skills course). Questionnaires were used to assess participants' metacognitive awareness and locus of control. Results indicated a significant correlation between participants' metacognitive awareness and locus of control. They found that "participants who tended to be more aware of their learning tended to contribute success to causes within their control" (El-Hindi & Childers, 1996, p.15). Students attributed their academic success to improved study habits (e.g., note-taking, attending classes).

Sherman's (1985) review of learning improvement programs generated several suggestions for helping students become more effective and efficient learners. Many of his suggestions emphasized the importance of learners expressing a "sense of control" over learning. That is, students who became academically successful eventually develop an internal locus of control. He suggested the following:

1. Through task definition, a process of assessing and matching variables internal and external to the learner with learning strategies, the learner gains independence and self-control over academic learning.
2. High achievers appear to consciously select skills for specific purposes and to combine these into a comprehensive plan for learning... the absence of this control skill separates poor learners from successful ones. Good learners appear to recognize and exercise control over learning by consciously selecting specific skills for each learning task (p. 90).
3. Learners who recognize their personal capabilities, understand the nature of what is expected, and coordinate their learning resources with the task demands appear to have a greater chance of success.... Learners who have many learning abilities, understand how to use these abilities, and understand themselves as learners are likely to select and use appropriate skills to master a learning task.... Learning is controlled by an executive function through which learners personally and

> actively define learning tasks and employ learning abilities (p. 93).
>
> 4. The learner is responsible for learning by activating and by effectively manipulating resources and demand characteristics to produce a personal study strategy appropriate for the specific task and content.... Learners who have and use many learning actions or skills have a higher probability of learning than learners with few skills because the former have alternative skills if first attempts fail (p. 94).
> 5. Positive effects accrue when learners recognize the extent to which they can control academic consequences. When learners see themselves as instrumental in achieving outcomes, they tend to gain higher levels of achievement. Learners who perceive themselves as potentially being able to exercise control over learning are more likely actually to attempt effective learning skills (p. 94).

Watkins (1987) conducted a longitudinal study to examine the effect of higher education on students' locus of control. Locus-of-control factors were also compared to students' study habits. He hypothesized that "an internal locus of control should be a causal factor in the students becoming less reliant on surface level learning strategies and in the adoption of deeper level and more achievement oriented approaches to studying" (Watkins, 1987, p.222). In other words, he sought to determine if improved study habits were associated with internality (i.e., internal locus of control). The results of his study indicated that there was no change in students' locus-of-control scores from their first to third year of enrollment (Watkins, 1987). However, his findings did support the contention that "the acceptance of personal control over one's learning success is a causal factor in the adoption of less superficial and more achievement oriented approaches to learning" (Watkins, 1987, p. 227). Watkins (1987) also recommended that successful study skills programs should "enable learners to recognize their own learning potential, and to accurately assess learning tasks; provide them with an adequate repertoire of learning skills; show them how to effectively match learning skills with learning tasks and how to monitor their own learning and use of skills" (p. 228).

In summary, these studies support the notion that there is a correlation between internality (i.e., internal locus of control) and improved study habits. The evidence indicated that students who exhibited a internal locus of control usually performed better academically and likewise possessed better study habits than their counterparts (i.e., externals). If internality is a desirable characteristic, then further research should be conducted to examine how study-skills educators can help students shift from an external to an internal academic locus of control.

Study Habits

Research on study habits has revealed that when students adopted particular habits, there often was an improvement in problem-solving abilities (Elliott et al., 1990), higher retention and comprehension of lectured material (King, 1992), better recognition of facts (Peterson, 1992), improved performance on multiple-choice test (Balajthy & Weisberg, 1990), significant improvements towards executive control (Nist et al., 1991), and improved study procedures, study orientation, and academic achievement (Haslam & Brown, 1968).

Balajthy and Weisberg (1990) examined the effectiveness of a four-step study method: (a) reading the passage to identify topics, (b) underlining and annotating, (c) creating graphic organizers, and (d) compare and contrast information from the text. They found that students who adopted these study habits had better performance on multiple-choice test and had higher comprehension and retention scores than those with low prior knowledge.

Elliott et al. (1990) reviewed empirical studies that investigated study habits in post-secondary settings. They reviewed 556 articles published since 1970. Their investigation revealed that when students adopted particular study habits (e.g., concept mapping, self-questioning, and monitoring one's time spent studying) they seemed "to have modest positive effects on students' achievement in courses" (Elliott et al., p. 712, 1990). They also recommended that educating students about their study habits would prove to be beneficial. They wrote,

> With a fuller awareness about goals, techniques, and ways to match goals to techniques, we believe students will be better positioned to approach studying strategically.... We hypothesize that students inherently engage in broader and deeper cognitive processing about their studying, as well as about the content they study. (Elliott et al., p. 713, 1990).

Haslam and Brown's (1968) study examined whether improved study habits and improved academic effectiveness would result from systematic study-skills instruction. A group of students received instruction in how to study whereas an individually matched control group was denied such instruction. Upon completion of the course, the two matched groups were compared. Administration of the Survey of Study Habits and Attitudes (SSHA) before and after study-skills instruction indicated significant improvement in the measured study habits of the experimental group. The students in the experimental and control groups were also compared on two indexes (i.e., grades and Effective Study Test). The experimental group was found to be significantly higher on both indexes. Haslam and Brown (1968) concluded that study-skills instruction did increase students' knowledge of effective study habits and subsequent academic achievement.

Nist et al. (1991) found that when students were taught study skills such as word meaning, organization, and executive control processes, their test scores increased. They wrote, "tactics relying on executive control processes, PLAE [planning, listing, activating, evaluating], and word meaning were consistently and statistically detectably associated with better test performance" (Nist et al., p. 708, 1991).

Other researchers identified particular study habits that proved to be empirically significant in terms of improving students' academic performance. For example, King (1992) found that students who adopted study habits such as self-questioning and summarizing had a higher percentage of ideas appearing in their notes. This resulted in higher retention and comprehension of lectured material, measured by multiple-choice items (King, 1992). Similarly, Ruddel and Boyle (1989) found that students who practiced making concept maps included more supporting details and cohesive ties in a summary of a text and had higher holistic scores on their summaries. Peterson (1992) examined the effectiveness of underlining on achievement measured by multiple-choice items. She found that students were more likely to recognize facts and inferences on a test if they had underlined the relevant word of phrase in the text they studied.

Learning Styles

There are a few notable definitions of the term "learning styles." Kolb (1984) offered a simple definition when he wrote "learning style refers to the individual's preferred ways of grasping and transforming information" (p.10). Keefe (1982) later added to this definition, "learning styles are characteristic cognitive, affective, and psychological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" (p.16). Similarly, Dunn, Dunn, and Price (1996) defined learning-styles research as "a comprehensive approach in the identification of how adults prefer to function, learn, concentrate, and perform in their occupational or educational activities" (p. 5). The key to understanding learning styles is that there is no right or wrong style and everyone can learn to use particular learning styles to their own advantage.

Learning-styles awareness involves students' knowledge of their own particular preferences for learning new information. Dunn, Dunn, and Price (1996) have identified four areas in which students may consider their preferences for learning: (a) environmental (sound, temperature, light, and seating design); (b) emotional (motivation, persistence, responsibility, and structure); (c) sociological (learning alone, with peers, with adults); and (d) physiological (perceptual memory strengths, intake, energy high and low, and mobility). For instance, some students may prefer to study in an environment that is well lit, while others prefer dim lighting; or some students may prefer to study alone, while others prefer to work with a peer or in groups.

Learning-styles research has been examined in terms of it's potential benefits to both students and teachers. For students, awareness of their learning style may significantly improve their academic achievement and study skills (Claxton & Murrell, 1987; Dunn, 1995; Fleming & Mills, 1992). For teachers, on the other hand, knowledge about students' learning styles may enhance the quality of instruction (Conti, 1985; Dunn & Deckinger, 1990; Faurier, 1984).

Impact on Academic Performance

Several research studies (Clark-Thayer, 1987; Claxton & Murrell, 1987, Dixon, 1985; Fleming & Mills, 1992; Miller, Alway, & McKinley, 1987; Weinstein, 1987; and Wratcher, 1991) have suggested that students' awareness of their learning styles may help them improve their study habits and thereby their academic performance. These findings are based primarily on the hypothesis that students' awareness of their learning styles may encourage them to accept more responsibility and take control of their academic behavior. In other words, academically students can learn how to shift their academic locus of control from an external to an internal mode by recognizing and accommodating for their individual learning preferences.

The most compelling argument for the use of learning styles research was presented by Fleming and Mills (1992). In their article, the authors discussed the use of learning styles preferences to "empower students to reflect on their own sensory preferences and modify their study methods accordingly" (p. 137). Based on their observations, they have concluded that it was not realistic to expect teachers to provide programs that accommodate the learning styles diversity present in their classes. They concluded that "the most realistic approach to the accommodation of learning styles in teaching programs should involve empowering students through knowledge of their own learning styles to adjust their learning behavior to the learning programs they encounter" (p.138).

Two questions guided Flemming and Mill's (1992) research: (a) how can students be encouraged to reflect on the nature, extent, and implications of their sensory modalities, and (b) will students modify their existing learning strategies in ways that assist their learning. To answer these questions they developed a technique that involved students in a discussion about their learning styles. First, they developed a 13-item questionnaire that served as a catalyst for discussion rather than an elaborate diagnostic tool. The questionnaire was used to encourage students to examine themselves in four perceptual modes: visual, aural, kinesthetic, and reading or writing. Visual learners were described as having a preference for graphical and symbolic ways of representing information. Aural learners were described as students who preferred to learn from lectures, tutorials, and discussions. Kinesthetic learners preferred to use experience and practice (simulated or real). Students who had a preference for information printed as words were categorized as read or write.

The modal preference profiles that emerged were discussed with students. The profiles were promoted as insights, not as definitive diagnoses. Students were encouraged to challenge their profiles. In this way they were actively encouraged to establish the validity of their profiles by thinking about their general applicability (Fleming & Neil, 1992).

Another study that strongly advocated the student empowerment approach was Clark-Thayer's (1987) doctoral dissertation. She used the term "executive control" to describe empowering students with awareness of their learning styles. Executive control was defined as "the function whereby the learner is aware of personal learning strengths, weaknesses, and needs and becomes a decision-maker among study options in order to monitor, adjust, and remediate learning needs for more effective and efficient learning to take place" (Clark-Thayer, 1987, p. 11).

Clark-Thayer's study was based on the premise that when students are taught, in a study skills course, how to take more responsibility and control for their learning, academically they achieve more. Knowledge of their learning styles could be used to capitalize on strengths, compensate for weaknesses, and provide for needs in study behaviors in order to facilitate learning ability in different subjects (Clark-Thayer, 1987). For instance, students who preferred to study with background music, alone, during the late morning, in a dimly lit informal setting, may not perform their best in absolute silence, with a friend, during the late evening, in a brightly lit library. This type of information is crucial for students to know when they are trying to create optimal learning environments for their studying.

The purpose of Clark-Thayer's (1987) study was to examine the relationships between student perceived learning style preferences, study habits and attitudes, and the academic achievement of college students. Students' learning styles were measured by the Productively Environmental Preference Survey (PEPS). The Survey of Study Habits and Attitudes (SSHA) was used to measure students' study habits. Achievement was measured by students' grade point averages earned during the previous semester. Participants (n=231) were grouped according to grade point averages on the basis of high, medium, and low. Clark-Thayer (1987) concluded that learning styles and study habits can contribute to students' academic achievement in college. "Learning style and study habits should be considered as possible factors that contribute to college success", said Clark-Thayer (1987).

In addition, Clark-Thayer (1987) also studied students' preferences for completing homework assignments based on their learning preferences. She discovered that when students were advised how to use their styles for doing homework at different times of the day and in different environments, their academic performance increased. One of the students reported that the best environment for her included sitting at a table near a window in a small room, earlier in the day than she had studied previously, and with the door closed. When she began studying this way, she experienced both improved grades and concentration (Clark-Thayer, 1987). Again, this approach advocated putting the responsibility for learning with the students. When college students are taught how to make these critical judgments in their learning process, they become empowered or in control.

Grimes (1995) studied the prescriptive use of learning style and learning strategy assessments for groups of students at risk. Her hypothesis was that "the combination of learning style and learning-study strategies measures could provide comprehensive, diagnostic information across physiological, cognitive, and some affective domains that have implications for prescriptive programs" (Grimes, 1995, p. 423).

Data was collected from 394 students enrolled in an open-admission community college. Participants represented three risk levels: (a) 138 high-risk students (GPA less than 2.0); (b) 188 orientation students representing the entering population; and (c)

68 low-risk students (pre-medical majors and honors students). Each participant was administered the Learning Style Inventory (LSI) to assess their preferred style. The LSI is a 45-item, self-report inventory. It provided prescriptive information to assist the student in using strategies to enhance learning through a better teaching/ learning/ study style match. The LSI assessed (a)cognitive style (auditory language, visual language, auditory numerical, visual numerical, tactile concrete); (b) social style (individual learner, group learner); and (c)expressive style.

Grimes (1995) concluded that a combination of learning styles and learning study strategies measures could be used to provide comprehensive diagnostic, and prescriptive information for some high-risk student groups. Mismatches with students/ instructional methods/ learning styles/ and study techniques may be avoided when learning styles and study preferences are taken into consideration. Grimes (1995) reported that "different learning style and learning-study strategies profiles of these targeted groups suggests additional research into the utilization of similar diagnostic, prescriptive models as a cost-effective method of identifying group instructional needs and targeting prescriptive programs to diverse student populations" (p. 428).

Wratcher (1991) examined a program that was designed to assist freshman in learning more about themselves as learners. She hypothesized that teaching students more about their learning styles preferences, they could adapt more easily to different environments and maximize factors that could contribute to their academic success. The Productivity Environmental Preference Survey (PEPS) was administered to 60 students. The results of the PEPS were explained to the students in a workshop format. The workshop discussion centered on the survey responses. Students were asked to diagnose their own learning styles before they were given their individual profiles so that they could see how accurate they were in assessing themselves.

Wratcher (1991) reported that feedback from students indicated that the learning styles inventory and workshop helped them learn more about themselves as learners. Most students reported they had never thought about their learning styles before, but "after the discussion they were able to analyze better learning situations where they were experiencing problems.... Students were able to see how they could maximize their learning by analyzing and making accommodations where necessary" (Wratcher, 1991, p.381).

Dixon (1985) asked, "how can learning style information be used to increase learning?" (p.16). She proposed that the learner be responsible for using the learning styles information and that instructors assume the responsibility for creating an environment in which the resulting diversity could be accommodated. The instructors' responsibility included: (a) helping students understand themselves as learners, (b) encouraging students to expand their learning styles, (c) using a variety of instructional approaches, (d) creating an environment in which diversity can thrive, and (e) creating a climate in which collaboration exits.

Dixon (1985) also noted that the implementation of learning styles information not only required students to understand and use their own learning strengths, but also to acknowledge the limitations of their preferred style and thus to begin to purposefully expand their repertoire of learning skills. She concluded by stating that "it is important that individuals understand their own learning style so they can create environments for themselves in which their learning is optimized" (p.26).

Nelson et al.(1993) conducted a study to investigate the effects of learning styles intervention on community college students' retention and academic achievement. The study included 1,089 community college freshman. The PEPS was used to diagnose students' learning styles. Academic achievement was measured by their fall, mean grade point averages.

The participants were divided into three groups that differed with the intensity of learning styles intervention. Students in group one received no exposure to learning styles information. Students in group two had their learning styles diagnosed and received instruction concerning interpretation of their profile. Students in group three had their learning styles diagnosed and received a series of three instructional sessions about how to use their learning styles strengths for the purposes of studying and doing assignments.

Although, the results of the study revealed that there was no significant difference among the academic achievement (i.e., grade point average) of students in either of the three groups, college officials did report that students found the information they had received to be useful when studying. Students also reported they were more optimistic about their academic futures. Nelson et al. (1993) concluded that "the gain in student retention seemed related to students' positive feeling about possessing a tool that empowered them to improve their chances for success in college" (p. 368).

Impact on Quality of Instruction

Matching teaching styles to learning styles holds the potential for increasing students' academic performance (Conti, 1985; Dunn & Deckinger, 1990; Faurier, 1984). In most cases, students' academic performance had increased when their teachers made adjustments in their teaching methods to accommodate learning style varieties. The following studies will demonstrate the impact of matching teaching and learning styles on students' academic achievement.

Doyle and Rutherford (1984) noted that:

> Learners differ in a wide variety of ways and these differences are likely to influence how they respond to and benefit from a given instructional method or program. If instruction is adapted to specific intellectual or emotional 'aptitudes,' then it would seem that more students would reach higher levels of achievement. (p. 20)

Andrews (1981) explored how teaching methods and students' learning styles jointly influenced learning outcomes. The study examined the "fit" between two different teaching formats and six student learning styles. Two teaching formats were labeled as Instructor Centered and Peer Centered. Instructor-Centered teaching was when the teacher taught the class using a mixture of mini lecture, answering questions, working problems, and calling on students to answer questions. Peer-Centered teaching was built around student presentations, student-to-student teaching, and the teacher served primarily as a consultant.

Andrew's (1981) study revealed that "an important key to educational improvement lies in matching educational methods with the learning preferences and styles of students" (p. 177). In other words, matching teaching styles and learning styles may help improve students' academic achievement. These findings also concluded that "optimum learning" was created when learning experiences maximize compatibility. That is, when learning styles and teaching styles were compatible, students approached their full learning potential.

Korhonen and McCall (1986) examined the concept of teachers using learning styles as an indicator of proper placement in learning environments. Learning environments were referred to as a stimulus, aside from instruction, that predicts learning (Walberg, 1974).

The study consisted of adults enrolled in ten classes. Five classes were structured as conforming environments and five were structured as independent environments. Conforming environments were defined as courses where material was presented solely through lectures with emphasis placed on facts and textbook readings. An independent environment was characterized by an emphasis on ideas and active participation by students in the learning process.

Participants were administered the Kolb Learning Style Inventory. This inventory identified four styles of learning: accommodators, assimilators, divergers, and convergers. Accomodators tend to rely on the judgment and impact of others. Assimilators brought together different observations and were good at integration. Divergers organized information and impressions into a meaningful whole. Convergers seemed to do best in learning interactions where specific problems had a single right answer or one solution. The authors of the study concluded that "learning style assessments of adult students entering an educational experience can provide an instructor with valuable information for planning activities and methods that will assist each student in the learning process" (Korhonen & McCall, 1986, p.23).

Mickler and Zippert (1987) conducted a study to examine the effects of adjusting teaching methods to coincide with the learning preferences of students enrolled in a small, predominantly black, community college. The learning styles of 30 students entering a freshman level social science class were assessed using the PEPS. Students were assigned to either experimental or control groups based on the results of their PEPS. Teaching strategies for the experimental group were modified to suit their learning styles, while the control group was taught by the traditional lecture method. Pre- and post-test measures on the Social Studies test of the College Level Examination Program (CLEP) were used to assess achievement in each group.

Analysis of the data revealed substantial differences in the scores of the two groups. The mean scores on the CLEP post-test for the experimental group were much higher than the post-test scores for the control group. Researchers concluded that when teaching methods were modified to correspond with assessed learning preferences, significantly higher gains on standardized achievement scores were evidenced (Mickler & Zippert, 1987). The authors further implied that the assessment of learning preferences would enable instructors to employ teaching strategies that may appeal to students and enable them to teach more effectively.

Dorsey and Pierson (1984) studied the use of Kolb's Learning Style Inventory (LSI) to guide counselors and faculty in dealing with adult learners. They hypothesized that the results of the LSI had implications for instructional methods, curriculum development, and counseling interventions. Dorsey and Pierson (1984) proposed that learning styles information on adult learners could "serve as a framework for designing and implementing adult educational programs" (p.8).

The results of Dorsey and Pierson's (1984) study suggested that teachers of adults could use learning styles findings by adjusting their teaching strategies to students' academic needs. The authors reported that when students' learning styles were accommodated by appropriate teaching methods, students demonstrated (a) increased academic achievement, (b) improved attitudes toward school, and (c) reduced discipline problems when strong preferences were responded to (p. 17).

Griggs (1991) believed that matching teaching and learning styles approaches was an educationally sound concept. She proposed that educators assess students' learning styles and provide teaching and counseling interventions that were compatible with those characteristics. She wrote, "our style of learning, if accommodated, can result in improved attitudes toward learning and an increase in productivity, academic achievement, and creativity" (Griggs, 1991, p.1). Her study revealed that teachers who used learning-styles research to accommodate the needs of students witnessed improvements in students' academic achievement.

Overall, the notion of matching teaching and learning styles has a great deal of potential for educational improvements. Advocates of this approach generally indicated four essential steps for educators interested in accommodating their teaching styles to students' learning styles. They suggest that teachers:

(a) examine students' individual learning styles, (b) understand and classify learning styles according to categories, (c) adjust their teaching styles to match students' learning styles; and (d) teach teachers to do steps 1, 2, and 3 in in-service training.

Models of Teaching

Many educational researchers (Gunter, Estes, & Schwab, 1990; Kozma, Belle, & Williams, 1978; Jacobsen, Eggen, & Kauchak, 1989; and Joyce & Weil, 1996) have considered the use of teaching models essential to effective teaching. Joyce and Weil (1996) suggested that effective education required combinations of personal, social, and academic learning that can best be achieved by using several appropriate models. Their writings demonstrated that instructors' use of teaching models has the potential to affect both students' academic achievement and the quality of instruction. Jacobsen et al., (1989) noted that models of teaching have the potential to increase student learning and help teachers become more effective professionals.

Family of Models

Prior to a discussion of the affect of teaching models on academic achievement and the quality of instruction, it is necessary to provide a brief overview of how these models are categorized. Joyce and Weil (1996) categorized models of teaching into four families based on the educational objectives of each model. The four families are social, information processing, personal, and behavioral. The four families all have unique educational objectives that make them distinctive from each other.

First, teaching models grouped under the social family category emphasize students' ability to relate productively to one another (i.e., work together). The social models of teaching are constructed to take advantage of the creative power of teamwork. The analysis of major social problems and values are examined. Second, models in the information-processing family emphasize ways of enhancing human beings' innate drive to make sense of the world by acquiring and organizing data, sensing problems, and generating solutions to them, and developing concepts and language for conveying them. These models are useful for studying the self and society and for achieving the personal and social goals of education. Third, models in the personal family begin from the perspective of the individual. They attempt to shape education so that students develop an understanding of themselves, take responsibility for their education, and learn to strive beyond their current development. These models pay special attention to the individual perspective and seek to encourage students to become self-aware and responsible for their own lives. Finally, models grouped in the behavioral family are designed to capitalize on students' ability to modify their behavior based on tasks and feedback. These models focus on observable behaviors and clearly defined tasks and methods for communicating progress to students.

Appendix A outlines the four families, their educational objective, and the models associated with each family.

Impact on Study Habits

Models of teaching have educational benefits for students that include gains in their aptitude for learning. Joyce and Weil (1996), in Models of Teaching, suggested that "the cognitive and social tasks that each model of teaching provides to students are designed to create energy that will result in particular kinds of learning" (p. 22). They claimed that students will change as their repertoire of learning strategies increases. As they are exposed to a variety of teaching models, students will be able to accomplish more types of learning more effectively (Joyce & Weil, 1996). Models of teaching can enhance students' ability to achieve various learning objectives. For example, Peterson, Marx, and Clark (1978) found that inductive teaching models have helped in improving students' social skills, cooperative learning behavior, induced students to take more responsibility for their education, substantially increased students' learning of basic skills and knowledge, and even improved students' performances on test of intelligence.

Gunter et al. (1990), in Instruction: A models approach, noted that:

> Instructional models, like patterns or blueprints or recipes, present the steps necessary to bring about a desired outcome. The selection of a particular model to use in an instructional design depends on the desired outcome or objective of the instruction. (p. 67)

She also suggested that effective instructional models benefit students in several ways: they allow students to become active participants in the learning process; take students through specific sequential steps; and reflect research about thinking, learning, and behavior. The teacher who utilizes a variety of instructional approaches accomplishes two very important educational goals: (a) she is more likely to reach all students in the classroom and (b) students are encouraged to learn in a variety of ways (Gunter et al., 1990).

Jacobsen et al. (1989), in Methods for Teaching: A Skills Approach, added that "students were attentive and involved when lessons followed a logical structure and moved along at a good pace" (p. 236). Essentially, teaching the use of teaching models sets the "logical structure" that is desirable in learning environments. By ensuring that lessons have a logic and structure that is communicated to the students, teachers can make their lessons more dynamic and alive by the interaction patterns that they choose (Jacobsen, et al., 1989).

Kozma, et al. (1990), in Instructional Techniques in Higher Education, also recognized that teaching models had potential benefits to students. They noted that the use of teaching models acknowledged the relevance of learner characteristics and aptitude. They considered the selection of a teaching model largely dependent upon the teacher's goals for students, the subject matter, and students' aptitude. They stated that "one method may be good for students with certain characteristics, whereas a different method would be better for the rest of the learners" (Kozma et al., 1978, p. 10).

An example from Kozma et al's. (1990) text described an experiment in which a personality test was used to identify two groups of students: independent and dependent. The dependent group was taught in a highly structured manner: material was presented solely through lectures; emphasis was placed on factual knowledge; attendance was required; and the lectures paralleled the textbook. The independent group was placed in an environment that put emphasis on ideas rather than facts and upon active participation by students. The researchers found that independent students rated teachers higher in unstructured classes. While dependent student rated teachers higher in structured classes.

Impact on Quality of Instruction

Teaching models also present benefits to teachers. Joyce and Weil (1996) observed that teachers gain personal satisfaction by expanding their repertoire of tools, and teaching is made easier by teaching students strategies for learning. Satisfaction from personal and professional growth should be reason enough for teachers to set a goal of not one or two basic models to use for all purposes, but a variety that they explore for the potential they hold for pupils and teachers (Joyce & Weil, 1996).

Gunter et al. (1990) also recognized that teaching models may improve the quality of instruction. They suggested that the use of models helps teachers accomplish several important tasks associated with effective teaching. Teaching models help teachers develop sound and functional plans. Models grow out of a clear understanding of the needs of learners and the goals of education. By identifying the needs of the students, models also help the teacher specify as clearly as possible the intended outcome of students' work. The teacher who works without a careful design leaves too much to chance. The teacher must determine if the instruction is producing the desired results. Likewise, the teacher must utilize effective evaluation procedures throughout the process of teaching. Models also encourage teachers to realize that students are individuals with special needs, strengths, and interests. Therefore, the teacher needs to have available a variety of approaches and techniques to accomplish specific instructional objectives and to manage problems as they arise.

Gunter et al. (1990) emphasized that teachers should learn a variety of instructional techniques. A repertoire of instructional and management strategies is necessary to meet the varied needs of learners. The teacher who uses a variety of instructional approaches is more likely to reach all students in the classroom; moreover, students are encouraged to learn in a variety of ways. When teachers have multiple instructional procedures available, they no longer rely on one technique to gain the interest of the class and to teach the material. When one process is ineffective, they can switch to others. The teacher becomes a professional problem solver and decision maker.

Jacobsen et al. (1989), recognized that teaching models benefit teachers by making their work more systematic. Teaching was made more systematic because models allowed for planning, implementation, and evaluation activities. Models also assist teachers in making better decisions about teaching. What would be the role of the teacher, the role of the student, and what materials would be used were decisions that had to be made by teachers when instructional models were involved.

Jacobsen et al. (1989) suggested that all teaching should begin with some kind of planning. They decided that the first step of the planning phase should be the establishment of some kind of goal. The second step in the planning phase is selecting a strategy and gathering the supporting materials. Research evidence supports the value of the planning process. Peterson et al. (1978) found that teachers' behaviors in the classroom depended on the plans the teachers made.

Implementation and evaluation are the second and third stages of Jacobsen et al's. (1989) model. In the implementation phase, the teacher accomplishes the teaching goal through selecting a strategy (e.g., expository, discovery, discussion, or inquiry). The teaching activity in the implementation stage is the actual performance of the strategy the teacher has selected. Evaluation is the final stage in this process. Here the teacher attempts to gather information that can be used to determine if her teaching has been successful. Administering a test or quiz, noting students' reactions to questions, or peer observations can be used to determine whether or not the goal established in the planning phase was reached.

Kozma et al. (1978) also recognized the potential for using teaching models to improve the quality of instruction. They suggested that the teacher should use models as a basis for selecting alternative ways of teaching that may be appropriate for the specific needs of each individual learner or cluster of learners. This information can be used in selecting appropriate instructional objectives and strategies. They claimed that instructors would be in a better position to act on a range of student needs if a variety of teaching models were part of their repertoire.

Summary

The objective of this study was to describe the effects of learning-styles awareness and knowledge of professors' teaching methods on the study habits of college students who were at risk for academic failure. In order to put this matter in context, research literature on the following components were investigated: the academic characteristics of college students at risk for failure, locus of control, study habits, learning styles, and models of teaching.

An analysis of the academic characteristics of college students at risk for failure revealed that these students could be categorized by academic variables such as low standardized test scores, weak educational backgrounds, unclear educational goals, low motivation, and poor study habits. In addition, the locus of control literature revealed that students who were at risk for academic failure usually exhibit an external locus of control. Improvements in study habits may shift their locus of control from an external to a more internal predisposition.

Study habits involve a variety of skills (e.g., note taking, annotating, planning, organization, time management, test preparation, concentration, underlining, concept maps). Researchers have concluded that when students incorporate these skills into their study habits, improvements in academic performance usually followed. Learning-styles awareness and knowledge of instructional models are the study habits that have been investigated in this study. Can similar improvements in study habits result from an awareness of learning styles and instructional methods?

METHODOLOGY

The purpose of this study was to describe how college students at risk of academic failure would use an awareness of their learning styles and an understanding of their instructors' teaching models to modify their study habits.

The purpose of this chapter is to describe the(a) research design employed in this study, (b) participants, (c) instrumentation (d) case study protocol,(e) procedure for data collection, (f) data analysis, (g) validity and reliability, and (h) researcher's bias.

Research Design

The research design used in this study was a descriptive, multiple case study approach (Borg & Gall, 1983; Yin, 1984). A rich, thick description of the phenomenon under study was provided so that the reader could understand the changes in study habits that participants in this study experienced.

Multiple case studies involved collecting and analyzing data from several cases rather than from just a single case. This design was used because it served to "strengthen the precision, the validity, and the stability of the findings" (Miles & Huberman, 1994, p.29). Describing multiple cases is a common strategy for enhancing the external validity or generalizability of the research findings (Merriam, 1998; Yin, 1994).

Description of Participants

The participants were six, first-year college students who were considered at risk for academic failure. At risk for academic failure, defined by the institution where this study was conducted, referred to any first-year student whose first semester grade-point-average was below 1.5 and the total number of credit hours passed was less than 12 (Southern Methodist University: Guidelines for first year students, 1997).

Candidates for the study were referred to the researcher by their academic advisor. To determine if individuals were potential participants, they completed a locus of control scale during their initial meeting with the researcher to measure their level of internality or externality. Candidates who exhibited an internal locus of control as measured by the Multidimensional Multiattributional Causality Scale

(MMCS) were welcomed to work with the researcher in his capacity as an academic counselor. However, a discussion of the content that usually ensued during subsequent meetings with these students was not included in this study. The remaining six candidates exhibited an external locus of control and were invited to participate in the study. One participant however, had to withdraw because of personal reasons. The experiences of the remaining five participants are documented in this study.

Participants in this study were at least 18 years of age. They all met the criteria for participation in this study (i.e., grade-point average less than 1.5, credit hours passed less than 12, and an external locus of control). None of them were identified or reported to have a learning disability of any kind. All participants exhibited a willingness to improve some area of their study skills.

Of the five participants, three were males (one African-American and two White males)and two were females(one Asian-American and one African-American). A more detailed description of each participant follows. Pseudonyms are used to protect the unanimity of the participants.

Dan, a White male, intends to major in psychology. He reported that in high school he rarely studied but managed to earn As and Bs in his classes. He was surprised at how poorly he did during his first semester. He attributed his poor performance to a lack of study skills and habits. While he did not have a particular area of interest that he wanted to improve, he stated that he needed to learn more about a range of study strategies. His academic advisor referred him to the researcher and he signed up for the study immediately.

Jen, an Asian-American female, hopes to major in biology. Her goal is to enter medical school. In high school she was a straight A student. She has attended private schools all of her life. She said that she was not surprised by her poor performance during the first semester and reported that she rarely studied. Although she believed that she knew how to study, her motivation was low. When her advisor suggested that she participate in this study, initially she was somewhat reluctant. After she learned the study might help her learn more about her learning styles, she agreed to participate.

Mike, a white male, plans to major in business administration. In high school, Mike was a C average student. He told the researcher that much of his difficulty in both high school and his first semester in college was due to being a slow reader. Mike insisted that he did not have a learning disability, and he refused to be tested. He believed he could do much better in college if he learned how to study better. He participated in the study because he wanted to learn more about particular study strategies, and he hoped that the individual attention would help him stay motivated.

Pat, an African-American female, intends to double major in psychology and Spanish. While in high school she excelled academically. She passed most of her high school classes with As and a few Bs. The difficulty she experienced in her first semester came as a surprise to her. She reported that she was not prepared to handle the amount of work that was required in college. She attributed her poor performance during her first semester to a lack of concentration and difficulty in handling course material. Pat's advisor referred her to the study. Her motivation for participating in the study was to learn how to improve her concentration, time management, and study habits.

Tony, an African-American male, will be the first in his family to earn a college degree. He plans to major is business administration. In high school, he earned a B average. He completed his first two college courses in college during a summer session and earned a B in both. However, he reported that he began to study less diligently during the following fall semester and his grades suffered. His academic advisor referred him to the study. His primary interest in participating was to improve his study skills.

The researcher greeted each participant at the beginning of each meeting. Next, they engaged in casual conversation and worked on tasks designated for each meeting. After completing their work for the day, the researcher confirmed their next scheduled appointment and informed the participant of what the agenda was for the next meeting.

For example, at one meeting a participant complained about people or things that affected his study habits. He said "my roommate came in and turned on the television." The researcher listened attentively and asked "how does that affect your concentration." The participant responded "I can't concentrate." The researcher suggested alternative study strategies, "have you considered studying in a different place." The focus of the conversation was to engage the participant in considering what things could be done to improve his study environment. The researcher had no prior relationship with any of the participants. His relationship with them was limited to interactions that occurred during the scheduled meetings.

Instrumentation

Two instruments were used in this study: the Productivity Environmental Preference Survey (PEPS) and the Multidimensional-Multiattributional Causality Scale (MMCS).

The PEPS (see Appendix E), developed by Dunn, Dunn, and Price (1996), is a comprehensive approach to identifying how students prefer to function, learn, concentrate, and perform in their educational activities. The inventory is used to identify students' preferences for 20 different elements in four general areas: (a) environment (sound, temperature, light, and design); (b) emotionality (motivation, responsibility, persistence, and the need for flexibility); (c) sociological needs (self-orientated, peer-orientated, authority-orientated, or learn in several ways i.e. sometimes alone, with peers and/ or with authority figures); and (d) physical needs (perceptual preference(s), time of day, intake and mobility).

The PEPS yields information about the patterns through which the highest levels of productivity tend to occur. For example, it reveals "how" students prefer to produce or learn best, not "why". That is, it attempts to describe "how" a student prefers to produce or learn, not the skills that are used to do so. The producers of the instrument hope that "following through on indicated preferences will maximize the use of learned skills, remove obstacles to creativity, and maximize performance" (Dunn, Dunn, & Price, 1996, p. 5).

A computerized individual profile (see Appendices F, G, H, I, J) of each participant's response to the PEPS is provided. Each profile contains the participant's name, identification number, gender, date answer sheet was scored, group identification number, raw scores, standard scores (mean of 50, standard deviation of 10), PEPS's area headings and a graph of the relative location of each person's standard score in each area. The standard score ranges from 20 to 80 with a mean of 50 and a standard deviation of 10. The standard score is based on a random sample of 1000 subjects from the national data base who have taken the PEPS. Individuals having a standard score of 40 or less or 60 or more find that element important when they study or work (e.g., light, noise, temperature, design). Individuals having scores that fall between 40 and 60 are indifferent with respect to how much that element is important to them; in this case other, learning style elements are usually more important.

The MMCS (see Appendix B) was developed by Lefcourt, Von Baeyer, Ware, & Cox (1979). Composed of two parts, each part deals with causal beliefs about students' achievements and affiliations. The MMCS is comprised of 48 items, 24 that relate to achievement, 24 with affiliation. Half of each set concern successes and half failures. Within each 12-item set, there are four attributions composed of three items each. These consist of "ability" and "effort" as the internal attributions, and "luck" and "context" as the external attributions.

There are a multitude of scores that can be derived from such a multidimensional scale. The scale can produce scores for each reinforcement area (i.e., achievement and affiliation) by subtracting internal attribution scores (ability and effort) from the equivalent external scores (luck and context). This study focused on the scores for the 24-items dealing with achievement.

Permission to use the PEPS was granted by the instrument's publisher, Dr. Gary Price. Robinson, Shaver, and Wrightsman (1981), in Measures of Personality and Social Psychological Attitudes, also verified that permission was granted by the authors whose scales were documented in their textbook. In the preface of their text they wrote "if all necessary information concerning a particular scale is included here, you are welcome to use the scale in your research" (Robinson, et al., 1981, preface).

Case Study Protocol

Yin (1984) has reported that "having a case study protocol is desirable under all circumstances, but it is essential if you are using a multiple-case design" (p. 64). The protocol served three functions: (a) it was a major tactic in increasing the reliability of a case study; (b) it reminded the researcher what the case was about; and (c) the preparation of the protocol forced the researcher to anticipate potential problems (Yin, 1984).

The case study protocol was developed and refined over the course of the study. The study was conducted over 10-weeks. During the first two weeks, participants completed an interview, an initial assessment, and experimented with learning styles elements. Over the next eight weeks, participants met with the researcher and discussed their learning styles and the instructional models of their professors.

The following components of the protocol: gaining access, selecting participants, initiating the study, and procedures for conducting the study, are described below.

Gaining Access

Candidates who fit the criteria were referred to the researcher by academic advisement staff at the institution where the study was conducted. This procedure ensured that the confidentiality of the candidates' academic records was not revealed to the researcher.

Selecting Participants

Participants were selected based on the following criteria:

1. Each participant had completed one semester of enrollment at the institution.
2. Each participant had been identified as at risk for academic failure by the institution.
3. Each participant demonstrated an external locus of control as measured by the MMCS.
4. Each participant had expressed an interest in improving his or her study habits.
5. Participants were selected without regard for race and gender.

Initiating the Study

Upon referral, candidates were interviewed and administered the MMCS to measure their locus of control. This instrument was used solely for the purpose of selecting participants. Although the MMCS was actually developed for usage in quantitative studies, in this study it was used simply as a selection device. Participants who exhibited an external locus of control were invited to participate in the study.

Protocol

The protocol for this study follows:

Meeting #1: Potential participants were introduced to the purpose of the study and were asked to sign the consent form. Next, each person took the Multidimensional Multiattributional Causality Scale (MMCS) to assess his or her locus of control.

Meeting #2: The results of the MMCS were discussed with each candidate. The six candidates that exhibited an external locus of control were invited to participate in the 10-week study.

Each participant then was asked to examine his/ her preference for 14 learning-styles elements. Fourteen elements were selected because they more easily lent themselves to experimentation. For example, it was easier for participants to experiment with their preference for lighting than it would be for them to experiment with their motivation. The elements that participants were asked to experiment with were: noise level, light, temperature, design (formal or informal study area), alone or among peers, auditory learning, visual learning, tactile learning (touching), kinesthetic learning (body motion) , intake (eating while studying), time of day, late morning, afternoon, and mobility (pacing will studying).

Five elements were left out of the journal activities. Elements such as motivation, persistence, responsibility, structure, and authority figures were excluded for the journal activities. Another element entitled "several ways" sought to determine if students preferred to learn sometimes alone, with peers, and/or with authority figures. This element also was excluded from the journal activity. These elements did not lend themselves to experimentation.

These experiments usually took about one to two weeks to complete. Initially it was anticipated that the participants would experiment with these elements for 10 weeks. However, all of participants returned after two weeks having experimented with all 14 elements. Most of the participants examined their preferences for several of these elements during a single study session. For example, some of them examined their preference for light, noise level, temperature, and design in a single study session. Students did not take long to realize that they either did or did not like studying in dim or bright lighting or quiet versus noisy settings.

Meeting #3: The researcher and participants discussed the participants' assessments of their styles. The participants' preferred learning styles were identified by exploring their learning-styles journal entries and their self-assessments of PEPS elements (see Appendix D pre-PEPS grid). Pre-PEPS is a grid that was used to discuss participants' preferences for particular learning-styles elements. This discussion was conducted prior to participants' actual assessment with the PEPS.

Meeting #4: The Productivity Environmental Preference Survey (PEPS) was administered to each participant (see Appendix E PEPS Instrument).

Meeting #5: The researcher discussed the results of the PEPS with participants and compared them to their self-assessments of the PEPS elements and the experiences with learning styles that were recorded in participants' journals.

Meeting #6: The participants were asked to describe the teaching methods of one of their instructors. The researcher explained to the participants that acquiring an understanding of these methods could assist them in having a better understanding of material to be learned and guide them in selecting more appropriate study habits. Following this conversation, the researcher observed the instructors' teaching methods.

Meeting #7: The researcher and participants discussed the ways in which professors delivered instruction. They also explored possible ways that students could adjust their study habits so that learning would be easier. The researcher tried to corroborate or refute students' perceptions of teaching methods by his own observation and identification of the models.

Meeting #8: After the researcher conducted a classroom observation to identify the instructional model, he met with participants to discuss how their study habits may have been impacted by this model. Each participant selected a class which the researcher observed twice, once at the fifth week of the semester and again at the tenth week of the semester.

Procedures

Five of the eight meetings with each participant were audio-tape recorded and transcribed by the researcher. The meetings that were audio-tape recorded and transcribed were: #3-- discussion of pre-PEPS; #5-- discussion of PEPS results; #6-- participants' description of teaching models, and #7 and #8-- discussion of teaching methods. The meetings that were not audio tape-recorded were meetings #1, #2, and #4.

These meetings involved an introduction to the study, signing of the consent form, and administrations of the MMCS and PEPS. The communication during these meetings was irrelevant to the content of the study.

Procedures for Data Collection

Several sources of evidence were obtained to provide a thick, rich descriptive account of the experiences that students had when they tried to incorporate an awareness of their learning styles and an understanding of their instructors' teaching models into their study habits. The use of multiple sources of evidence (triangulation) is a common practice in case study research and helps to reduce potential biases that might result from relying on a single source of data (Borg & Gall, 1983; Yin, 1984). These sources of evidence were: the Productivity Environmental Preference Survey (PEPS), a learning-style journal, discussion transcripts, and direct observations of classroom teaching methods.

Cornett (1983) identified a variety of commercially published instruments designed to measure one or many aspects of learning styles. Her list included multidimensional instruments, cognitive styles instruments, affective styles instruments, and perceptual modality instruments. Some of the instruments on her list included the Learning Style

Identification Scale, Group Embedded Figures Test, Learning Style Inventory, Learning Methods Test and the Inventory of Learning Processes. None of these instruments were as well equipped to analyze learning style preferences for adults on as many modalities as the PEPS.

Although the PEPS was developed for the purposes of quantitative study, in this study it was used to assess participants' learning style characteristics. Participants' self-descriptions of their preferred learning styles were discussed in their journals and in interviews with the researcher. In this study the learning-styles findings were examined both quantitatively (i.e., PEPS) and qualitatively (i.e., learning-styles journal and interviews).

The second source of evidence was the learning-styles journal. The journal was a 15-page packet that included blank sheets for journal entries. The packet consisted of a cover sheet description of all 20 elements and 14 blank sheets for the participants to describe their learning-styles experiments. Participants were asked to experiment with only 14 elements and describe their experiences (i.e., difficulties, productivity, setting, study needs, benefits, etc.) in the journal.

The third source of evidence was transcripts of audio-taped discussions (meetings #3, #5, #6, #7, & #8). With the participants permission, discussions regarding learning-styles experiments, teaching-model observations, and their impact on study habits were tape recorded. These tapes were transcribed by the researcher.

Another source of evidence was direct observations. The researcher asked each participant to select one class that they would like to discuss the professor's teaching model. The researcher attended the class and observed the teaching method. At a later meeting date, the researcher and the participant discussed the professor's teaching method and how their understanding of this teaching method could assist them in better understanding the course material and preparing for class. The researcher attended two class sessions for each participant. Ten class visits were made during the semester. Classes were attended during the 4th and 12th week of a 17 week semester.

According to Yin (1984), "the validity of a study is strengthened if the researcher presents a strong chain of evidence, that is, clear meaningful links between research questions, raw data, and findings" (p. 576). Hence, four sources of evidence have been used to strengthen the validity of this study. The results of the PEPS helped to corroborate experiences that each participant reported in his or her learning-styles journal. The learning-styles journals were used to encourage participants to reflect on their preference for learning-styles elements. Transcripts of audio-tape recorded discussions were used to excerpt direct quotes from participants. Finally, classroom observations were made to strengthen the discussion of the use of teaching models as effective modifiers of students' study habits.

Data Analysis

The data analysis in this study was developed based on Merriam's (1998) step-by-step description of category construction. Category construction is the identification of recurring patterns and themes that cut across the data (Merriam, 1998). Merriam (1998) wrote, "devising categories is largely an intuitive process, but it is also systematic and informed by the study's purpose, the investigator's orientation and knowledge, and the meanings made explicit by the participants themselves" (p. 178).

Category construction began with reading the first case (i.e., interview transcripts, journals, pre-PEPS, and PEPS results). As each transcript was read, notes, comments, observations, and queries were written down in the margins. These notations were written next to portions of data that were interesting, relevant, or important to the study. This process is known as memoing. After working through the entire transcript in this manner, the researcher reviewed his notes in the margin and grouped those notes that seemed to fit together.

The next case was analyzed in a similar fashion; keeping in mind the list of groupings that were extracted from the first case. A separate list of comments and notes were made for this case and then this list was compared with the one derived from the first case. The two lists were merged into one master list of concepts derived from both sets of data. These patterns and themes then became the categories and themes into which cases three, four, and five, were analyzed.

Validity and Reliability

Efforts to ensure validity and establish reliability in this study were addressed through careful attention to the study's conceptualization and the way in which the data was collected, analyzed, and interpreted. Case study researchers have concluded that traditional notions of validity and reliability do not apply to case study data and interpretation (Borg & Gall, 1983; Lincoln & Guba, 1985; Marshall & Rossman, 1987). Quantitative researchers judge the quality of research designs by three types of validity (i.e., construct, internal, and external) and reliability criteria. On the other hand, qualitative researchers apply such criteria as credibility, dependability, transferability, and confirmability to case study findings.

The purpose of this section is to discuss validity and reliability issues (i.e., credibility, transferability, dependability, and confirmability) as they relate to general case study research and, more specifically, to this study. Credibility refers to the truthfulness of the findings. Lincoln and Guba (1985) have suggested that there are two ways to establish credibility for case-study findings. First, multiple sources of evidence are obtained. In this study, the sources of evidence included interview transcripts, results of PEPS inventory, participants' journal entries, and observations of selected professor's models of teaching. Second, the credibility of a study can be enhanced by having a prolonged involvement with the participants. To enhance the credibility of this study, participants were involved over a 10-week period.

Transferability refers to whether the findings can be generalized to different persons, settings, and situations. Lincoln and Guba (1985) claimed that transferability was not a goal of qualitative research. Instead, it is the responsibility of the reader to determine whether the results of this study can be transferred to a particular situation. However, Lincoln and Guba (1985) did suggest that it was the responsibility of the qualitative researcher to "provide the data base that makes transferability judgments possible on the part of potential appliers" (p. 316). In this study a thick, rich description of the participants' experiences has been provided to enable the reader to determine whether the results could be generalized to different persons, settings, and situations.

Dependability refers to the reliability, consistency, and predictability of the findings. Lincoln and Guba (1985) have suggested that the dependability of a case study could be strengthened by a "dependability audit," which is the process of having a second party examine the data. For the purposes of this study, a graduate student in the Department of Educational Leadership agreed to assist the researcher by conducting a dependability audit of a small sample of the learning-styles and teaching-models transcripts. There were a total of 20 transcripts. He examined two learning-styles transcripts and two teaching models transcripts. From these transcripts, he documented the categories and themes observed in the data. Although he used different terminology, many of the categories he documented were similar to those that the researcher had observed. However, he also recognized categories that were somewhat irrelevant to the study. For example, the auditor documented the number of times the participant paused prior to responding to a question. For the purposes of this study, such information was irrelevant.

The last issue involving validity and reliability of case study findings involves confirmability. Confirmability refers to whether the findings of the study are reflective of the subjects' experiences or the products of the researcher's bias. Lincoln and Guba (1985) suggested that a subjectivity audit, triangulated data, or a reflective journal would serve to strengthen confirmability of the research study.

In this study triangulation was used to reduce the effects of researcher bias. Triangulation is the process of using multiple data-collection methods, data sources, analysts, or theories to check the validity of case-study findings. Borg and Gall (1983) said, "triangulation helps eliminate biases that might result from relying exclusively on any one data-collection method, source, analyst, or theory" (p. 574).

The learning-styles journals, pre-PEPS, and the results from the PEPS inventory were used to generate the learning-styles findings of each case. For example, participants' comments in their journals were compared to their transcript interviews and results from the PEPS inventory. Consistencies and inconsistencies among these sources of data were examined and discussed in the results of this study. Teaching-model findings were developed using similar techniques. Students were asked to discuss what they saw their professors doing in the classroom, and the researcher sought to refute or complement the students' findings by observing the professors himself. Hence, students' observations and researcher's observations were used to triangulate the findings regarding teaching methods.

Researcher Bias

The purpose of this section is to give the reader some perspective on the researcher's frame of mind. This section includes a discussion of my background, a description of how this study evolved, and an overview of potential biases that may have influenced the findings. The intention of this profile is to give the reader the perspective necessary to judge the validity and value of the findings.

The impetus for this study began as I reviewed the literature about the effects of college-study-skills courses on students' academic performance. Many educational researchers seemed to agree that college-study-skills courses had a positive affect on students' academic performance and retention (Abrams & Jernigan, 1984; Cone, 1991; Cone & Owens, 1991; Kulik, et al., 1983; Robyak & Downey, 1979; Tarpey & Harris, 1979; Wratcher, 1991). Many of these reports cited significant quantitative improvements such as increased grade-point-averages and retention figures.

One could conclude from such results that students' study habits may have improved as well; however, this notion is only implied in these studies. None of these reports examined the experience from the students' perspective. Unanswered questions arose such as: What changes were made by the students? What problems did students experience when they tried to incorporate these skills? How did students feel about what they had learned? Did students change any of their study habits? Therefore, I sought to examine what the effects were of study-skills training on students' study habits. Specifically, I wanted to examine how training in learning-styles awareness and teaching methods might affect students' study habits.

I thought learning-styles awareness would be an interesting approach to improve study habits because of my work with student athletes. During my counselor education training, I had an opportunity to serve as an academic mentor for a group of student athletes who were at risk for academic failure. I noticed that many of these students were exceptionally talented athletes, but poor performers in the classroom. On the playing field, they were able to process large amounts of information and react to situations in a split second. However, they were unable to perform at this level in the classroom. I soon learned that many of them had kinesthetic or tactile learning styles. Their preferred mode of learning was by acting something out or by touching it. I began to wonder if helping them understand more about their learning styles might assist them in developing more effective study habits.

My interest in familiarizing students with teaching methods as effective study strategies grew out of a graduate course called Bases of Curriculum and Instruction Theory. The literature suggested that a solution to dealing with marginal students, students who have difficulty relating to an educational environment and profiting from it, would be "to attempt to teach the learners to relate to a wide spectrum of learning environments" (Joyce & Weil, 1996, p. 365). That is, students may learn to use strategies of each model to educate themselves. This process is known as learner flexibility training. Joyce and Weil (1996) concluded that "each model of teaching can be seen as a model of learning, a way of helping students expand their styles of approaching problems now and in their futures" (p. 386).

In the literature on both learning styles and instructional models, their affect on study habits was not explicitly illustrated. However, one might implicitly assume that improvements in students' academic performance (i.e., GPA) were a result of improved study habits. Therefore, this study was designed to explore this issue. Five students' described their experiences as they acquired insight into their learning styles and instructor's teaching methods and the ways this information impacted their study habits.

It is important to note that my interpretation of the data may be colored by my beliefs that (a) learning-styles research has some value in teaching and learning in higher education; (b) students' study habits may improve when they learn more about their learning style preferences; (c) when students learn that their academic performance is a direct result of their effort and preparation, better grades are possible; and (d) students' awareness of learning-styles elements can help them improve their study habits.

Included in this study were four procedures that were designed to reduce researcher bias. The first is a case study protocol. The protocol served to guide the study as well as provide consistency in the handling of each participant. In addition, the protocol may also served as a guide for other researchers who wish to duplicate this study. Second, a dependability audit was conducted by another researcher. A sample of the data was analyzed by an independent researcher to corroborate themes and patterns that were identified in this study. Third, anecdotal evidence was used to support the findings. That is, direct quotes from the participants were frequently used to present their side of the story. These quotes were used extensively in Chapter Four--Presentation of Data. Fourth, multiple sources of evidence were used to corroborate other research findings. A learning-styles inventory, learning-styles journal, pre-PEPS, and interview transcripts were used to support the statements made by the researcher.

PRESENTATION OF DATA

The purpose of this study was to describe the experience of five students as they incorporated an awareness of their learning style and an understanding of instructors' teaching methods into their study habits. The objective of this chapter is to describe that experience. Each case illustrates how learning about learning styles characteristics and teaching methods of their professors impacted students' study habits.

The cases are presented in alphabetical order. Each participant was assigned a pseudonym (i.e., Dan, Jen, Mike, Pat, and Tony). In each case, the events are presented chronologically as they were experienced by the participants. For each participant, data is presented in two major areas: learning-styles findings and teaching-methods findings.

The discussion of each participant's learning-style findings are organized around three categories: (a) discussion of learning-styles journal, (b) pre-PEPS discussion, and (c) results of PEPS. Next, the teaching-methods findings categorized by the: (d) identification of the teaching model, (e) evidence of the student's awareness of the teaching method, (f) effects of the teaching method on student's study habits are described. The locus-of-control findings are sorted by: (g) the effects of learning-style awareness on locus of control and (h) the effects of knowledge of teaching methods on locus of control.

With regards to the data presented in the learning-styles journal, all of the participants (except Tony) wrote one to two sentences on each entry. Tony typed at least a paragraph of his responses to each learning style element. However, all of the participants were much more expressive about their preferences for particular learning-styles elements during our individual meetings.

Case 1: Dan

Dan was a rather reliable participant. He attended meetings regularly and arrived on time. He gave detailed feedback at each phase of the study: during our initial discussion of his learning style preferences; while we examined the results of his learning style inventory; and throughout the process of observing his instructors' teaching methods. It was obvious that he had reflected on these topics and wanted to learn more about how he could use them to his advantage. He exhibited a positive attitude from the beginning of the study until the end. I could tell he truly wanted to improve his grades.

Dan told me that in high school he was among the top academic performers. As a result, he shared that he was quite surprised to find himself performing so poorly after his first semester in college. He did not anticipate performing at this level. He said, "I didn't think college was going to be this hard. I studied some in high school and I made all A's. But, here I study a lot more and I'm struggling to make C's. I don't understand what I'm doing wrong." He wanted to do better, and he knew he needed some help. He figured his problems may have had something to do with his study habits. He believed that he did not know where to start tackling his problems. He said,

> When my advisor told me about what you were doing, I told her to sign me up immediately. I really need help this semester, but I don't know where to start. If I have another bad semester like the last one, then I'm outta here.

Findings Related to Participant's Learning Styles

It appeared as if Dan had previously reflected on his preference for a few of the learning style elements. With strong convictions, he knew exactly what his preferences were. He seemed eager to learn more about his learning style. He completed his learning style journal in a little more than one week, and he preferred to discuss his preferences rather than write extended explanations in his journal. What surprised me was the accuracy with which he predicted some of his PEPS scores.

Pre-PEPS discussion

Four interesting themes emerged from Dan's pre-PEPS learning-styles transcript: (a) his awareness of his particular learning styles; (b) the fact that many of his learning-styles preferences depended on the subject matter; (c) reflections from past learning experiences, and (d) the effect of this awareness on his study habits.

From our discussion, it seemed that Dan was already aware of many of his preferred learning styles. When asked about his preference for moving around while learning (mobility) he stated,

> I didn't write anything about mobility. But, I know for me sometimes it helps for me to just move around. I remember like ah.... When I am trying to memorize things, it really helps me to like pace or walk around.

Dan's preference for elements such as formal versus informal study areas, and auditory learning, were dependent upon the subject matter. In response to his preference for auditory learning, he said,

> It's really different for different subjects. Some are, you know,... I guess like math, I can learn just by reading it up on the board and by doing it. And then... but if someone told me how to do it I would be like, what? But, if it is another subject, it could be totally opposite. I could probably understand it if someone just told me.

When I asked Dan about his preference for formal versus informal study areas, he said,

> I prefer formal; it helps me concentrate better. It's hard for me to write in an informal area. But, for like reading, it's a lot easier to do it informal. For studying and taking notes and writing, sometimes I need very formal settings.

Many of Dan's pre-PEPS predictions were based on his reflections of past learning experiences. When asked about his preference for eating while studying (intake), he responded, "I remember in high school, I would come home from school and I would have a snack and do my homework. So, I mean, I have always found it kinda helpful."

Another reflection on a previous learning experience came from Dan's description of his preference for moderate temperature. He said,

> Like, in high school, if I was really cold, I would shiver a lot. Like, in one class, I was sitting right next to the vent, and I was just shaking. I could not concentrate. And at some point during the summer for about three to four weeks that air condition broke down, and you are just sitting there sweating. I was just thinking, I would rather be somewhere nice and cool.

In the pre-PEPS discussions, Dan also mentioned how what he knows about his learning style has effected his study habits. I asked him if he learned anything that might change his study habits, and he said,

> The noise level--that helps a lot. Because, at home, it was basically always quiet. And then, now I know that I can get rid of those distractions. And it helps you kinda find your environment out so that you can study more efficiently.

This discussion also seemed to help Dan realize that much of the responsibility for his academic success depended on him. If he wanted to improve his academic performance, he realized that he would have to make some changes. When asked about his preference for the time of day to study, he said,

> Well, early morning, I am accustomed to going to class. In high school, I was in class in the afternoon. Sometimes, in college I have that time off. So, I guess I have to figure out how I am going to spend my extra time.

Overall, Dan's preferences for the 15 learning-styles elements could be summarized as follows. He indicated that he preferred quiet study environments, with bright lighting. He was indifferent to temperature. He also preferred formal learning settings that included a desk and chair. He preferred to work alone, but he would not mind working with an authority figure from time to time. For auditory, tactile, visual, and kinesthetic learning he was indifferent. Basically he had not thought about or had not had enough experience with these elements to truly assess what his preferences were. He suggested that he absolutely must have something to snack on while studying. He preferred to study in the evenings; mainly because he had classes all day long.

Discussion of the learning-styles journal

After our pre-PEPS discussion, I asked Dan to use one to two weeks to experiment with the 14 learning-styles elements and to record his preferences in his journal. He returned his completed journal the following week. He responded, "It only took me a week to do all of them. I experimented with a couple of them at the same time." Although he did not record much in his journal, his verbal descriptions of his activities clearly illustrated his experiences.

In his journal, Dan recorded his preference for "sound" while studying. He wrote, "I learned that I work best in a quiet place with very little noise." All of Dan's journal entries were similar to this; he clearly but briefly stated his preference. Dan preferred to talk about his preferences rather than write about them. Another explanation for why he did not write more in his journal could be that this activity may have become a burden when he was studying for other more important assignments. Therefore, it was much easier for Dan to simply explain these preferences during our weekly meetings. During one of our meetings, he offered more details about his experiment with "sound". He said,

> I tried working in my dorm room with people walking in and out and that was just causing distractions. Then I tried to study in the dorm when no one was there, and I could accomplish a few things or I would just go to the library.

The distinction between journal entries and discussion was apparent in Dan's reporting of his preference for light. In his journal he wrote, "dim light made me sleepy, bright light kept me focused." However, he was much more detailed in our discussion of this element. He said,

> I found dim light made me just real sleepy. With dim light, I had rather go to sleep. But with bright light, I was able to study better, it kept me awake. Kinda like, umh, in the library you have real bright light, and in my room I turned off the light and pulled up the shade. I have my desk right by the window, and I guess it was not as light as it should have been. But there was enough light, so you could read, but the dim light kinda made me tired.

Results of the PEPS

After weeks of discussing these matters via pre-PEPS and journal activities, both Dan and I were excited that he would finally take the PEPS. We were curious as to whether the 100-item survey would reveal preferences similar to those that Dan had previously predicted in his journal entries and pre-PEPS discussions.

When the results of the inventory arrived, we were amazed at the number of elements that were in accord with Dan's previously indicated preferences. At our fifth weekly meeting we discussed these results. The major patterns and themes that emerged from this conversation included (a) his awareness of his learning styles and (b) behavioral changes associated with learning-styles awareness.

An example of Dan's awareness of one of his learning styles occurred during our conversation about his auditory learning score. His auditory score was 61, indicating that he had a strong preference for learning by hearing things. I asked what he thought about that score, and he said,

> I might learn better by hearing it, but I am still kinda indifferent. I notice that my visual score is pretty high too. Like, I notice that when my teachers talk and then put graphs or something on the board, I noticed that that helps a lot.

Dan felt absolutely comfortable and confident about refuting the score on the PEPS instrument; he felt his own experience was a much stronger indicator of his learning-styles preferences.

Another pattern that emerged in our discussion of Dan's PEPS results was the behavioral change associated with learning-styles awareness. As a result of an increased awareness, Dan reported the he sought more suitable learning environments and that he used learning-styles elements as learning aids.

During the pre-PEPS discussion, Dan indicated that he preferred to study during the evenings. His PEPS results corroborated this preference. When I asked him if he agreed with the PEPS results and if he made it a habit to study in the evening, he said "Definitely! I can't study in the morning at all... late afternoons to evenings." Consequently, he has made a concerted effort to study during the time of day that is most suitable to his learning styles.

Another behavioral change associated with Dan's learning-styles awareness involved his ability to apply his preferences for some of these elements as learning aids. When I asked Dan what he had learned that he might do more of now, he suggested that he would pay attention to his preference for intake while studying. He said,

> Yeah, it kinda puts in perspective at least what you prefer and things that you would kinda like. Some of these things I had already known but it kinda puts them up in the open now.... I mean, I may have snacked a little and it may have helped some, but I never paid much attention to it.

Dan provided evidence indicating that this awareness could affect study habits. I asked him if he thought about these elements when he prepared to study, and he replied,

> Yeah, I do that a lot with like lighting and noise level. I mean I haven't really had too much time to think about it. But, I usually do think what can I do to improve my learning. I think back on things that I learned with you.

Findings Related to Instructor's Model of Teaching

Through conversation with Dan, I was able to learn much about the instructor's model of teaching. Dan reported what he believed was the role of the students and the instructor, the instructor's use of supplemental material, and if the class was lecture or discussion. Dan suggested that an observation of his English class would be beneficial to him. He indicated that the instructor assigned several writing assignments. When I asked him if the class was lecture or discussion, he responded, "I would say it's more discussion. We talk about whatever we're working on. Like right now what we're doing is peer editing and reviewing papers." The instructor reviewed several rough drafts of students' papers before they had to turn in the final draft. Based on videos, lectures, articles, and readings, students were required to identify a common theme and develop a paper. When I asked Dan how his paper topics were developed, he said,

> We have to think, OK what have we read that relates to this topic, and it's not always so obvious. We have to figure it out. We have to be able to figure those connections out and write about them.

Based on Dan's descriptions and my classroom observations, it was apparent that the instructor was using the "thinking inductively" model of teaching. Using this approach students learn how to collect information, to closely examine it, to organize it into concepts, and to learn to manipulate those concepts (Joyce & Weil, 1996). The primary application of the model is to develop students' thinking capacity. Dan's English instructor used this method when developing paper assignments. The instructor exposed students to a number of sources (e.g., videos, articles, textbook chapters, lectures) and then asked them to write a paper that drew from all of these sources.

Dan described the teaching method as follows:

> Like, in The "Paper Chase" [a movie] there were some issues about contracts and in "Claming Medication" [a movie] there was a contract between the patient and doctor that was important.... What she [the teacher] suggested was that we look at other works that we read and go back and figure do they relate to something that we are writing now.

When I asked him if he had to develop the topics for his paper on his own, he responded, "Yeah, which was a hard thing to do. Because I had to think about it for a long time and go back and look at a lot of other stuff." Based on my classroom observations and Dan's descriptions, I concluded that the teaching model the instructor used was thinking inductively.

Dan's motivation to be successful in his course work seemed to be influenced by the teaching methods used by his instructors. He described a course in which the instructor gave frequent feedback. There were multiple opportunities to submit rough drafts before the final paper was due. About the frequent feedback, he said, "That makes me feel better. Because she cares enough to pay attention to what we need to work on that she sees as a problem." I asked him if it was helpful for him to submit several rough drafts before submitting the final paper, and he responded, "Yeah, it motivates and pushes you to get the paper right. And it's good because we have several opportunities to improve on the paper."

I asked him to talk about his study habits in classes where constant feedback and evaluations were not common. He cited his psychology class as one example. In discussing this psychology class, Dan explained,

> Yeah, I'm wondering if I should even go to that class today. I'm like, I don't even feel like going because we're not even going to do anything. But in Spanish, there's no question, you just go. You don't think about missing that class.

Dan's study habits also were affected by his instructors' teaching methods. Dan noticed something interesting about how the structure of the class affected his study habits. He observed that his study habits largely were dependent on the structure (i.e., feedback, frequent evaluations, intense reading assignments) of the class. He said,

> For the classes that tend to be bigger, those lecture classes like computers and psychology, those are classes I tend to study for less. Because, for some reason, I feel less pressure because there is not constant feedback, because we don't have quizzes, we don't have little homework assignments every day.... But, whereas in Spanish or something, the teacher is always, like, 'we have to do this and have it ready in two days', and there is stuff that needs to be done right away.

Another example of how the teaching method affected Dan's study habits became apparent when we discussed the role of the textbook and handouts in lectured material. I asked him if he thought it was important for him to read the textbook prior to attending the lecture. He said,

> Yes, definitely yes! If you don't, she'll know because when she calls you... you won't know the answer, and she'll know you didn't read. So you better read if you want to know what's going on.

I also asked him to discuss how the teaching method in his Spanish class affected how and when he studied. He said, "I study a lot more for it because I know I am going to be tested everyday... I make sure I study every night for Spanish."

Findings Related to Participant's Locus of Control

Dan's score on the MMCS indicated that he had an external academic locus of control. That is, he contributed most of his academic success or failure to factors beyond his control. Dan believed things such as faith, luck, and the teacher had more control over his academic performance than his own efforts. Our conversations were analyzed to determine the impact of learning-styles awareness and knowledge of teaching methods on his academic locus of control.

Locus of control and learning styles

The objective was to examine if acquiring an awareness of his particular learning style would affect Dan's academic locus of control. By understanding his preferences for particular learning-style elements, would Dan begin to take more responsibility for his academic situation? An analysis of Dan's learning-style transcript revealed statements which were characteristic of an internal academic locus of control. For example, Dan's experiment with his preference for sound while studying revealed his attempt to control his learning environment. He said,

> I tried working in my dorm room with people walking in and out and that was causing distractions. Then I either study in the dorm when no one was there and I could accomplish a few things or I would just go to the library.

He learned from this experience that his preference for sound was "quiet, but maybe with soft music. I could get work done in that type of sound environment", he said. This example illustrated Dan's internal locus of control for influencing his study environment.

There were several examples of behaviors associated with Dan's awareness of his learning styles that would indicate the development of a more internal academic locus of control. For example, he adjusted the lighting in his study environment to accommodate for his preferences. He said, "In my room I turned off the light and pulled up the shade. I put my desk right by the window." He learned how to chose between formal and informal settings to complete his school work. He said, "For studying and taking notes and writing, sometimes I need a very formal setting.... Well for reading, if I am reading for a long period of time I get kinda uncomfortable.... I need a formal setting for math." He also demonstrated an internal locus of control by recognizing and choosing to study during his best times. He said,

> I could still learn if I were to take down notes and everything, I could still study but I would rather wait until I was more wide awake.... I just basically rather study at night, or between classes if I have any time.

Locus of control and teaching models

An examination of our discussion regarding the teaching models of Dan's instructor also provided evidence of an internal academic locus of control. Dan made statements that were characteristic of an individual with an internal locus of control. For example, he described his English professor's teaching model as a discussion. After further review, we identified the model as "thinking inductively." Dan demonstrated an internal academic locus of control when he discussed the fact that it was his responsibility to prepare for the writing assignments "we have to talk about the paper, what works in the paper, what doesn't work in the paper... what we can change in the paper... what's good about it, what's wrong about it."

In addition, Dan also cited the effects of the teaching model on this thinking process. He said, "we have to think 'OK what have we read that relates to this topic' and its not always so obvious. We have to figure it out.... We have to be able to figure those connections out and write about them." Dan understood that it was his responsibility to identify the relationships between the material presented and the writing assignments he was required to complete.

When I asked Dan how he came up with the topics for his papers, he responded, "That's something I came up with on my own.... Because I had to think about it for a long time and go back and look at a lot of other stuff." Dan believed responsibility and the control of his performance belonged to him.

Summary

Learning-styles awareness certainly had an effect on Dan's study habits. Dan initially began the study with a great deal of insight regarding his preferences for particular learning-styles elements. Dan's predictions on his pre-PEPS assessment and learning-styles journal were corroborated by his PEPS results. He also discussed how he could and has used this knowledge to improve his study habits and concentration. Specifically, Dan discussed how he made adjustments in his study environment and used learning-styles elements as learning aids.

Knowledge of teaching models also effected Dan's study habits. Dan recognized that he was more motivated to learn and study when his teacher used a highly structured teaching approach. On the other hand, he was less likely to study and be productive in teaching environments where there was little structure and few opportunities for feedback from the instructor. The structure used by the instructor certainly effected Dan's preparation and study habits in his courses.

It appeared as if Dan's locus of control was effected by his awareness of his learning styles and knowledge of instructional models. Dan appeared to develop a more internal academic locus of control from his awareness of his learning-styles preferences. This was evidenced by his beliefs and behaviors to consider his learning-styles elements when studying. Dan's knowledge of teaching models also appeared to shift his locus of control from an external to a more internal predisposition. Dan spoke of his decisions to choose his own paper topics and think through his assignments.

Case 2: Jen

Jen was an A average student in high school. She attended a private high school in the area. Her parents were very involved in her education. Jen reported that they spared no expense in getting her the best education in the area. She mentioned that she attended private schools for as long as she could remember. Her high school was highly selective, and there she received a great deal of individual attention. Her parents thought it would be a good idea if she attended a small, private college such as Southern Methodist University.

Jen participated in the full 10 weeks of the study. She attended all of her meetings and completed all of the activities assigned. Her interest in the study was high until about the fifth week of the study. After five weeks of discussing her learning styles, she began to seem annoyed by this topic. However, at the sixth week, we switched our conversation to teaching methods. I also discussed other study strategies such as time management, organizing a notebook, and test taking tips with Jen to keep her interested in the study. These represented some of the matters that Jen had difficulty with in her classes.

With the increased freedom and a tougher academic curriculum, Jen struggled her first semester. By the end of her first semester, she ended up on the university's at-risk list. She said, "I wasn't surprised at my grades because that first semester I did nothing. I hardly studied and I was just glad to get out of the house."

When her academic advisor suggested that she get involved in this program, she was reluctant. She said, "I knew what I did wrong my first semester. I just didn't study at all. I know this semester I just need to study some and I should do better." Although she was reluctant to participate, she became interested in the study after our initial meeting in which I told her that she would be learning more about her learning styles. She said, "I've always been interested in learning about my learning styles. Once in high school we talked about learning styles, and I have been trying to find out more about mine ever since."

Findings Related to Participant's Learning Styles

In Jen's case, we ended up doing the learning-styles journal first. At our first scheduled meeting, Jen had a scheduling conflict with another appointment, so we did not have time to discuss the pre-PEPS grid. Instead, I explained and assigned to her the learning-styles journal and the pre-PEPS discussion was rescheduled for the following week. Her journal proved to display some very interesting insights about Jen's learning-styles preferences. There was a bit of confusion about a few elements, but for the most part this activity proved to be educational for both of us. Several themes emerged that would lead to changes she would make in her study habits.

Discussion of the learning-styles journal

During this phase of the study, Jen was asked to explore learning-styles preferences. She completed her experiments in one week. Her responses ranged from one to two sentences. She seemed to learn a lot from experimenting with many of these elements. She admitted, "I never thought about a lot of these things as being part of my learning styles. Like light and temperature, I thought, 'What does that have to do with my learning style?'"

Several of the observations that Jen made in her journal were insightful. For example, her journal entry for light read, "More light than extremely dim--if there is not sufficient light, I can't see. I prefer sunlight over artificial." Not only does this observation illustrate her preference for light, but she describes the type of light she preferred--sunlight. When I asked her if she already knew she preferred sunlight over artificial light, she said, "I hadn't noticed that before until you suggested that I try it."

Another interesting observation Jen reported in her journal concerned her preference for either working alone or with a peer. She wrote, "English papers--like to work with one expert in the field [i.e., professor]. Math--group or with tutors. Everything else alone." It is clear that her preference for this element depended upon the subject matter.

Something that was confusing about Jen's journal activity was what she wrote about her preferences for elements such as auditory, visual, tactile, and kinesthetic learning. She seemed to indicate that she had a preference for each one of them. She wrote about auditory learning, "I definitely understand and remember better when I hear things aloud." Then she wrote about visual learning, "I like to mix this with the auditory learning style. Seeing and hearing is much better than reading only." About tactile learning, she expressed, "I prefer to work with models and real instruments. For example, if I'm learning how to program a computer, I'd much rather do it while learning, instead of reading for weeks, then finally get to touch the instrument." Finally, about kinesthetic learning she explained, "Most of the time I like to act things out while I do them. First I'll act it out, then read about what I just did." Jen's observations were peculiar because students usually have a preference for at most two of these learning modes. I had hoped this could be cleared up during the pre-PEPS discussion or on the PEPS itself.

Finally, Jen discussed her preference for time of day. In this case, her preference for the time of day she studied, depended largely on her class schedule rather than her learning-styles preference. For many college students, the time of day they prefer to study is the time that is available and the time that is most convenient. Usually, it was in the late afternoon (3-5 PM) or in the evening. She wrote "recently I've been studying during the afternoon because it's when I'm not in class. If I study too late at night, I end up falling asleep."

Pre-PEPS discussion

During this meeting, Jen completed the pre-PEPS grid. Since she had experimented for a week with many of them, she had a fairly clear understanding of what her preferences were.

Three themes emerged from the transcript of our pre-PEPS discussion: (a) behavioral changes associated with learning-styles awareness, (b) preferences for particular elements depending on subject matter or situation, and (c) the effect of learning-styles awareness on study habits.

Jen shared that she felt her study habits had changed in two ways as a result of her learning-styles awareness. First, she sought learning environments that were better suited to her preferences. Second, she used elements as learning aids. An example of where Jen actively sought a particular environment that was more appropriately suited to her learning styles follows. When I asked her whether she preferred a formal or informal learning design, she said,

> Aah, the desk, it's like a classroom environment. I don't really like that for studying. I like a big comfy chair; I like to sit in my little house shoes with a big sweat shirt... that's in my room. Yeah as long as everything is around me, because I

> don't like getting up and walking around looking for stuff.

An example of how Jen used an awareness of her learning-styles preference to aid her in learning follows. Based on her own observations, she suggested that she had a strong preference for visual learning. I asked her if she did anything to her hand-written notes to help her learn them, she said,

> You see, I draw little graphs and pictures. Yeah, they show like, this is Economics, it shows, like, supply and demand. So, I draw a graph to help me understand. Like public relations there are many things that relate to each other. So, I draw lines and highlight materials to remember them better.

Another theme that emerged in the analysis of our pre-PEPS conversation was the fact that, for some elements, Jen's preference was dependent on the subject matter and situation. For example, in her journal and in our conversation, she indicated that her preference for working alone or with a peer was contingent largely upon the subject matter which she was studying. In her English and mathematics classes, she did not mind working with others; but for all other subjects (e.g., public relations and psychology), she preferred to work on her own. She said,

> In English, we do it every time there is a paper due. We all get together and help each other out on papers. We all read each other's papers and lend a hand. Because with English papers you have to have feedback. Math--I work with peers in tutoring.

A final observation made from Jen's pre-PEPS discussion transcript was about the effect of learning-styles awareness on her study habits. I asked her if an awareness of these learning-styles elements helped her become a better student or changed her study habits. She responded,

> I don't think it will really change. Because it is just basically analyzing what I do. I am predicting that I am going to stick to studying in the afternoon. But as far as the other elements, I am set in my ways. Like informal or formal, I am definitely formal, and mobility I don't like it.... This is just like an examination of myself. But for the most part, I don't think I am going to change anything.

At this point, Jen reported that she probably would not make any change in her study habits as a result of her participation in this study. Jen decided she would not change her study habits. She knew what worked and did not work for her, and she thought it was unlikely that she would change anything.

Based on her learning-styles journal and pre-PEPS discussion, Jen's learning-styles profile was developed. She was somewhere in the middle for her preference for noise; an environment that is not extremely quiet or extremely loud would be her preference. She definitely preferred bright lighting, preferably sunlight, when she studies. Her temperature preference was cool. The informal study design (e.g., soft pillows, couch, bed) is best for her. Formal learning settings (e.g., desk, tables, chairs, classroom) make her sleepy and are not conducive to her concentration. She seemed indifferent to auditory learning, but she has a preference for visual, tactile, and kinesthetic learning. She does not like to eat while she is studying; eating is a distraction to her. Her preferred time of day is to study in the morning and afternoon.

Results of the PEPS

The PEPS results revealed some interesting information: (a) the results of her auditory, visual, and kinesthetic learning preferences; (b) her time of day preferences; (c) some contradictory scores; and (d) the effects on her study habits.

In her learning-styles journal and pre-PEPS conversation, Jen indicated that she had preferences for auditory, visual, kinesthetic, and tactile learning. As stated before, it seemed odd that she would have preferences for all of these elements, while most students prefer at most two. The results of her learning-styles inventory confirmed my suspicion. Jen scored high on auditory (64) and kinesthetic (60) learning. Her scores for visual (46) and tactile (54) learning indicated that she was indifferent to these elements; she did not have a strong preference for either tactile or visual learning.

When I asked her how accurate she thought the PEPS was in predicting her auditory and kinesthetic scores, she responded to both by saying, "Yeah, that's pretty accurate... yeah, I would agree that that is one of my strong points. I notice that in my classes." However, she was surprised at her score for visual learning (46). This score basically says she is indifferent to learning things visually. When I asked her how she felt about this score, she said, "It's pretty weird because I thought I was more visual than that. One thing I noticed is that I like to use all of my senses to learn."

Via journal activities and pre-PEPS discussion, Jen and I learned that her preference for the time of day she studied was based on a matter of convenience, rather than the time she had available. Her PEPS results supported this conclusion. She scored a 41 on time of day, suggesting that she preferred to study in the evening rather than the morning. When I asked her about this score, she said, "I think it's because in the morning I have so many other things to do.... I can't study at that time even if I want to."

Another interesting discovery revealed by the PEPS results was the score Jen received for her preference for mobility. Jen had commented in both her journal and during our pre-PEPS conversation that she did not like moving around while learning. She said, "moving around serves as a major distraction. I prefer to have everything I need within arm's length so I don't have to get up." To both our surprise, she scored a 65 for mobility, implying that she preferred to move around while studying. When I asked her how she felt about that score, she said,

> Like if I start cramping when I am sitting still for so long, then I, like, have to move..., like, I might only do that if I am taking a break. But, otherwise, I don't really know.

In one of our previous conversations, I asked Jen if she would change any of her study habits because of her learning-styles awareness; she responded, "Probably not." After an examination of her PEPS results, I asked Jen if her awareness of these elements came to mind when she found her concentration waning. She said,

> Oh yeah. Stuff like light and temperature. I am paying attention to all of the time now. Before, I did not think about it much. And my motivation... you know I have a problem with that already... concentration and stuff like that. I get distracted too quickly if things just aren't right in my environment sometimes.

During our pre-PEPS discussion, I asked Jen if she would make any changes to her study habits based on her learning-styles awareness and she responded, "I don't think I will really change." However, after the discussion of PEPS results, her response to this same question was,

> Ahh, maybe just trying to pay more attention to why I can't concentrate whenever I find myself wondering off. I'm not always clear to where I lie on each thing, but it's good to know what they are so I can pay more attention.

Findings Related to Instructor's Model of Teaching

Jen described her engineering class as composed of lectures. She reported the instructor did most of the talking, while students rarely asked questions. The supplemental instruction (lab) associated with the course was helpful in breaking down the massive amounts of information. The instructor lectured from visual displays and a course packet. Jen mentioned that she rarely had to take notes in this class because the course packet usually contained all of the lecture material. She said, "A lot of times, I don't take notes because in the course packet... I could just look back in the course packet and go from there to try to understand it." Because the textbook was not very helpful, most students referred to the course packet and lectures for most of their material in preparing for the class. The instructor assigned and collected assignments weekly.

Based on my observations and Jen's description of the teaching methods, it seemed that the teaching model the instructor used most nearly matched Joyce and Weil's (1996) "direct instruction." Within this approach to teaching, the instructor directs and controls the learning task. The teacher maintains a central role during instruction and minimizes the amount of nonacademic discussion. In the learning environment, students are expected to listen to lecture and learn passively.

From the analysis of the transcripts of our conversations, Jen seemed to develop an understanding of the teaching model used by the instructor and how it influenced her study habits.

Jen demonstrated her understanding of the teaching method by explaining what she thought was going on in class. She said,

> Well, it's mostly lecture, and he shows a lot of slides and visual stuff. Most of the lecture he is getting from our course packet.... The whole lecture comes from the workbook or the course packet, same thing. The slides he shows come from the workbook. I just keep my workbook open and write notes in that.

Jen also discussed how this teaching method affected her study habits. Jen described her difficulty understanding and her ability to keep up with the lectures. From my observation, it appeared that the instructor expected students to read prior to attending class. He alluded to terms and definitions that were familiar only to students who had read the assignment ahead of time. After we discussed strategies for preparing for class, I asked Jen to think of study strategies that might be helpful. She responded,

> I should read more before and after the class. Because, I could imagine that the lecture would seem so much different if I had already read some of the assignment and then hear him lecture on the subject. Then, I might understand what the heck is going on. But, sometimes it's hard to find time to read before class, because I got many other things going on. I got other classes, and I hate waking up early in the morning.

One strategy for becoming more successful in this class would be for Jen to read ahead of time. Of course, reading ahead of time would require her to change her study habits. She has been accustomed to reading the assignment after class.

Another interesting effect of the teaching method in this class is its effect on Jen's behavior. Because the instructor rarely stopped to allow students to ask questions or checked students' comprehension, many students got lost in the lecture. I asked Jen if the instructor stopped to check students' comprehension of the lectured material and she responded, "No, he never stops during the lecture. Some people stop him during the lecture and ask questions." When I asked her how she felt about doing that, she replied, "I ask him questions after class." Understanding the instructor's teaching method seemed to effect Jen's ability to take the initiative and ask questions in class.

Findings Related to Participant's Locus of Control

An examination of our discussion regarding learning style and teaching models revealed that Jen still exhibited characteristics of a student who had an external academic locus of control. She clung to many of the beliefs that her academic situation were a result of others' behaviors. Rarely did she indicate that any awareness of her learning styles or knowledge of teaching models would influence her locus of control.

Locus of control and learning styles

It did not appear as if Jen's locus of control had been effected by her awareness of her learning styles. For the most part, she continued to ascribe external factors for her inability to accomplish certain tasks. For example, she explained that "late morning" was not an appropriate time of day for her to study. Her reason for this preference was indicative of a student who had an external academic locus of control. She said, "as long as I don't have any people or TV around, I can concentrate fairly well at that time frame."

Another example of Jen's tendency to exhibit an external locus of control appeared in her response to her preference for working with an "authority figure" on academic assignments. On her PEPS she scored a 63 on this element. This score indicated that she preferred to have an authority figure, a supervisor or an adult, present while she worked or studied. She explained this preference by stating "...there was a time when I worked with an instructor to get my psychology experiment done and I felt a lot of comfort knowing that he knew what he was doing and he would guide me in the right direction." Although this is a valid explanation, it indicated that her comfort level was based largely on the need for someone else to "guide [her] in the right direction."

The strongest evidence of Jen's externality appeared in her statements regarding her PEPS scores for motivation (39) and responsibility (46). Her motivation score of 39 indicated that her motivation was relatively low. Her explanation for this score indicated an external academic locus of control. She said,

> When I am doing good in school, my motivation is high. But when I am not doing good, then my motivation is low. And right now, I am not doing all that good. And sometimes it depends on the subject that I am taking. If I have a class that I like, then I enjoy doing the projects for that class.

Similarly, she explained her score for responsibility. Her score of a 46 puts her in the middle for that element. Again, her explanation for this score would support the claim that she continued to exhibit an external academic locus of control. She explained, "If I like the subject, I won't forget about it. But if I don't like it, then I might forget about it. So I would say that it depends on the assignment whether I am responsible or not."

Locus of control and teaching models

An examination of our discussions regarding Jen's instructor's teaching model also revealed evidence of externality. Jen cited four external factors as reasons for her academic difficulty in engineering. She blamed her difficulty in this class on a boring instructor, a difficult textbook, a lack of feedback from the instructor, and the inability of the instructor to explain the subject matter clear enough for her to understand.

First, Jen claimed the "boring instructor" was her primary problem in this course. She said,

> The way he talks and the class is so boring that it's hard for anybody to stay awake... it's just so boring. He is so darn monotone... it is just his voice is so low and monotone. He just puts people to sleep and there is no variety in what he does. Everyday it's the same things. Just so darn boring.

Second, on several occasions Jen mentioned the textbook as a source of difficulty in her class. She said,

> I try to read the book, but it's so hard to understand that book. I wish he would lecture some from the book.... Well the textbook is just

> like a whole bunch of words and you could get lost in it.... The subject is so boring and the textbook is so hard that I learn nothing when I review on my own. I really need someone to explain it to me and then let me read it.... The textbook is written in some type of language that beginning engineers just can't understand without some type of explanation. I don't even see why we have the textbook, because we don't get anything out of it.

She also cited the instructor's lack of feedback and inability to explain the subject matter to the class as other problems that were interfering with her ability to learn the material. In regards to feedback she said, "You are waiting about a whole week after you give it to him before he gives it back. By the time you get it, sometimes its too late to make your corrections and get ready for the test." She also complained that her instructor did not do a good job of explaining the subject matter. She said,

> We have a discussion but I never know what he is talking about. I mean he is so knowledgeable about the subject that it's hard. I mean I get lost in all that.... It's hard when someone has so much knowledge of the subject for me to ask them a question.

Summary

Initially Jen firmly stated that she would not change any of her study habits as a result of her participation in this study. She believed that this analysis of her learning styles simply reinforced what she already knew about herself as a learner. However, after a few weeks of examining her learning-styles preferences and how they effected her ability to concentrate while studying, she admitted, "I'm not always clear to where I lie on each thing, but it's good to know what they are so I can pay more attention."

Jen's instructor used the "direct instruction" model of teaching. We discussed the possibility of Jen reading the assignment ahead of time to keep up with the lecture. Jen thought this was a good idea and decided to incorporate this into her study habits for this particular class. In this case, knowledge of the instructional model was helpful.

In terms of Jen's locus of control, she showed no signs of growth. Jen continued to blame external forces for her inability to perform academically. Jen failed to suggest any new possibilities of improving her study habits based on her understanding of her learning styles or knowledge of teaching models.

Case 3: Mike

Mike began the study hoping to improve his reading rate. He admitted that he always had been a slow reader. He struggled with reading assignments in high school, and now in college, he found himself even further behind. He also noticed that he had a difficult time taking notes from classroom lectures and organizing his time outside of class. He attributed much of his dismal performance in the first semester to poor reading skills and study habits. About his first semester, Mike said, "My first semester was a disaster. I knew after the first four weeks that I was gonna be in trouble. I was behind in all of my reading assignments, and I had no idea how to study in college."

Mike was a very average student in high school. He did just enough to make Bs and Cs. Even then he noticed that it took him a little longer than his classmates to get his reading assignments done. One of his English teachers suggested to him that he might have a learning disability, but Mike refused to get tested for it. With the university's accommodations (e.g., un-timed tests, books on tape, tutors) available to students with learning disabilities, he is now reconsidering getting tested.

Mike chose to participate in this study mainly because of the individual attention he felt he would receive. His advisor described the study to him, and he was attracted by the opportunity to meet with someone on a weekly basis to discuss his academic situation. He said, "I just need somebody to help me make sure that I'm doing the right things. Cause sometimes I don't know what I need to do next." The fact that learning styles and teaching methods were the matters that were going to be discussed did not seem to matter to Mike; his only concern was to have someone to talk to about his academic situation.

Findings Related to Participant's Learning Styles

From the onset of the study Mike suggested that the benefit of learning about his learning styles was simply being aware of what his options were. He understood that if he was aware of his options, he could use this knowledge to influence how he studied. His journal entries were very brief, but he enjoyed talking about his preferences. Most of his preferences were at the extreme ends of the scale; few of them were in the middle. That meant that he had strong convictions as to what his preferences were. The accuracy of his predictions were amazing when compared to his PEPS results.

Pre-PEPS discussion

During the second week of the learning-styles examination, Mike and I discussed his preferences for each element using the pre-PEPS grid. From Mike's experimentation with dim and bright light, he discovered that lighting did not make a difference in his ability to concentrate while studying. He marked an "X" in the center of the grid for lighting. Because placing the "X" in the center indicated that he was indifferent to that element, his comments concerning his preference for this element were:

> I don't think it matters to me one way or another. Although, I know that if it is extremely bright to where I can't even see the words, then that is not good. As far as it being dim or light, that does not bother me.

Three major themes emerged in our pre-PEPS discussion: (a) the use of learning-styles elements as learning aids, (b) time of day preference, and (c) awareness of learning-styles preferences.

At the very onset of this conversation, Mike communicated his understanding of the importance of being aware of his learning styles. I asked him to talk about his experience experimenting with these elements. He said,

> You know, I don't know if any of these are one-hundred percent me. What I have decided after doing all of this is that the most important thing to me is being aware of what these factors are, how they can hinder my concentration, and if I notice that my concentration is hindered, what I can do about changing it. As far as noise level, I don't have a picture-perfect noise level. You know what I'm saying? Sometimes, I can sit down and read, and people are talking, and I can, you know, and sometimes I just can't. So, I guess the key for me is just knowing that they are there and knowing that I can change it.

Mike also mentioned several times how he might use his preference for some of these elements as learning aids. For example, Mike's preference for tactile learning helped him improve his study habits and memory of statistics. I asked him to comment on what he wrote in his journal about his tactile preference, and he said,

> I put 'I like to solve problems through real life experiences.' It really seems to help me out. Especially, like, in statistics. When I really started taking my calculator out and started solving the problems when he [the instructor] started solving them..., you know, at first, it was not logical to me because he is the professor and he is gonna get it right. But I actually just tried to do it, and I realized that it does seem to help me out. It helped me learn it. I don't understand why, but it seems to help me learn it.

By actually working the problem on his own in class while the instructor was working the problem on the board, Mike began to understand the statistics problems better. He attributed this understanding to using his tactile learning preference. That is, he improved his memory for completing such mathematics problems by actually doing them while the instructor was doing them on the board.

I asked him to talk about his preference for mobility, and he said, "Mobility, it helps me sometimes. That kinda went along with kinesthetic. Sometimes, I stand up and pace while I am reading, and that helps me concentrate. It prevents me from being tired..."

When I asked him what his preference for time of day was, he responded,

> This aawwh... [pause], I really didn't have a chance to experiment with this very much... [pause], mainly because I have set study hours that I have to study, or else I won't be able to study. Although, I prefer the mornings or mid evenings, you know, not later than 10 p.m... because the afternoons around 2 p.m. are not too good... well, I just have class every morning from 9 til noon. Everyday from 9 til noon, I have class. I can't study during that time. So, I have to do it in the afternoon.

Since Mike had classes in the morning, he was unable to study during that time. At the conclusion of this meeting, Mike reiterated his understanding of the importance of learning-styles awareness. He said,

> I think that that was the most important part of this exercise, is having the knowledge and knowing what the different factors are that can affect my concentration. Now I can manipulate them to enhance my concentration if my concentration is poor. I mean, if I can sit down and concentrate well, then that is not a problem, but it is when I have a problem concentrating, when I think about how I try to change my noise level or lighting. I just assumed that most people did that because I have always tried to do that. I mean, if somebody is bothering me talking I have to get up and move. Otherwise, I am not going to get anything done. However, I would have never considered the lighting being the factor. I would have never thought about the food being a factor. So, it is good to know those things and I feel like it is things that I can use to get me in the mood of concentrating.

Discussion of the learning-styles journal

Mike also reported in his journal, elements for which he had a clear preference. Those elements included noise, temperature, studying alone or with peers, visual learning, and time of day. In his journal, he reported his preference for noise, "Absolutely quiet is good. Also, some noise is OK, unless I can discern the words being said." His preference for temperature was reported as, "I prefer a cool temperature to a warm temperature. A warm setting will cause me to go to sleep. However, the temperature must not be cold enough to make me uncomfortable." His time of day preference was illustrated by his journal comments, "I like to study in the morning or in the evenings. I have a hard time staying awake in the afternoon."

Mike completed his journal in approximately one week. Many of his responses ranged from one to three sentences. In his journal, Mike indicated that he was indifferent to the following learning-styles elements: light, design, intake, and mobility and decided that they did not effect his ability to concentrate when studying. For example, in his journal, he recorded his preference for lighting as "I have no preference to light other than it must be light enough for me to see." Whether the light was dim or bright did not make a difference for him.

Results of the PEPS

At the end of the pre-PEPS discussion, Mike took 15 minutes to complete the PEPS. We discussed the results (see Appendix H) of his learning-styles inventory the following week.

Three major findings resulted from the analysis of Mike's PEPS results: (a) degree of consistency between Mike's prediction and the actual results, (b) the relationship between his learning styles and subject matter, and (c) the effects of learning-styles awareness on his study habits.

Most of Mike's predictions that were ascertained from his learning-styles journal and pre-PEPS discussion were corroborated by the inventory results. The inventory results for elements such as noise, light, temperature, design, structure, studying alone or with peers, auditory learning, intake, time of day, and mobility were similar to what he stated either in his journal or during the meetings with the researcher. For example, he reported his preference for temperature was for it to be cool; his PEPS results for the element of temperature was 39 (cool temperature). When I asked him if he still agreed with that assessment, he said, "Yeah, I agree with that. I like cool, but not so cool that I have trouble concentrating."

In other examples, Mike initially indicated that he preferred structure such as frequent feedback from his instructor. He scored a 64 on the PEPS for this element, meaning that he wanted structure. I asked him how he felt about his PEPS score for that element, and he said, "I'd say that's probably pretty accurate."

Mike stated in his journal entries and pre-PEPS discussion that he did not prefer to learn new information through auditory learning. In his journal he commented, "I seem to fall behind when listening to a lecture and trying to grasp it all." The PEPS results confirmed this preference; he scored a 44 on this element. I asked him how he felt about the accuracy of that score, and he responded,

> Well, I would say that I am definitely not interested in learning material through auditory methods. I have trouble concentrating in lectures and stuff like that.... I mean, I struggle paying attention in lecture classes, because when I am listening, I might stop to comprehend something closer and then I notice that the teacher has long moved on to some other point. By the time I catch up, I have missed a few important points. I need the information to be presented to me at my own pace, and usually lecture is well beyond my pace.

A final example of where the accuracy of the PEPS instrument was demonstrated was with Mike's preference for walking around while studying. In his journal, he recorded, "It helps me concentrate." On the inventory he scored a 59, meaning that he had a strong preference for that element. When I asked him how he felt about this score, he responded, "Yeah, that is definitely true. Basically, I concentrate better if I know I can just get up and move around from time to time..., not all the time but just every now and then."

Mike's PEPS results were amazingly similar to the self-report (i.e., journal activity and pre-PEPS discussion) of his preferences. This is a testament not only to the accuracy of the instrument, but more importantly, to Mike's awareness of his own particular learning-styles preferences.

Another interesting development that emerged from the PEPS results was the fact that many of Mike's preferences for particular elements were dependent upon the learning experience associated with various courses. For example, Mike's preference for working alone or with a peer is largely dependent upon the subject matter. He noted that with subjects like mathematics and science, he preferred to work with others. On the other hand, for English and psychology, courses that are characterized by immense amounts of reading, he stated,

> Anytime when I just have a lot of reading to do and that's it, I pretty much need to be alone. However, I have experienced some times when I enjoy reading something while someone else reads the same thing and then we discuss it. I just need someone to bounce it off of.

Similarly, Mike noted that the amount of structure that he needed from his instructors also was dependent upon the class and the assignment. For example, for writing assignments he stated,

> A lot of writing assignments tend to be so vague. I need to know ahead of time exactly what is expected of me.... I mean I need to know everything before I can even start, because I don't want to waste my time doing the wrong thing.

There was some evidence that an emergent awareness of his learning styles affected Mike's study habits. Mike is a commuter student. Therefore, he sometimes finds himself having to study in odd places--on the bus, on the train, in the commuter lounge. He is indifferent to the noise around him while he is studying. That is, he can study whether or not there is noise. Mike's indifference to noise allowed him to study whenever and wherever he wished. He said,

> I mean, sometimes I am bothered by noise and sometimes it just does not matter one way or another. I can study in the library where it's quiet, or I can study in the commuter lounge where people are coming in and out.... I mean I can have noise all around as long as it is not disturbing to me. As long as I don't understand or can't hear the words, then noise does not bother me.

A second example of how learning-styles awareness affected Mike's study habits was in his preferences for auditory, visual, tactile, and kinesthetic learning. He did not wish to choose only one of these modes of learning as his preference. Instead, he suggested that he would prefer to use them in combination. In our PEPS results conversation he said, "I can see myself doing several of those things while I am studying or listening to a lecture. I would say that my score should be closer to the variety area."

A third example of the effects of learning-styles awareness on Mike's study habits occurred at the closing of our PEPS results conversation. I asked Mike if it ever occurred to him that he could adjust one of these elements to improve his study environment, he said,

> Yeah, yeah... I've had to always be aware of my study environment.... I try to be aware to a certain extent of the different elements that help me study better..., you know, the light, the temperature, the noise, stuff like that.

Findings Related to Instructor's Models of Teaching

The class that Mike chose to discuss was his Theater class. During their discussion about teaching models, the researcher asked him to describe the teaching method. Mike responded,

> We get the notes from videos, his [the instructor's] lecture, and sometimes he might ask us to read a short article or something. But, for the most part there is no real textbook or anything that we have to read. Most of our notes come from what he says. And then there is a lot of interaction with the class..., he may ask questions and sometimes he asks for volunteers to do stuff in front of the class. Like, he would demonstrate some acting technique in front of the class, and he always uses a volunteer.

It was difficult to clearly identify the instructor's model of teaching, based on his description. Later I also observed the class and noticed that the video and other media the instructor used were presented at the beginning of class. In addition, I noticed that the video presented a much broader issue that would later be discussed in the form of a lecture or class discussion. According to Joyce and Weil (1996), the "advanced organizer" model best characterized this instructor's model of teaching.

This model is designed to strengthen students' cognitive structures (Joyce & Weil, 1996). Cognitive structure is the factor governing if new material will be meaningful and how well it can be acquired and retained. The model has three phases: (a) the presentation of the advanced organizer (b) the presentation of the learning task, and (c) the strengthening of cognitive organization.

For example, showing a movie and then lecturing on the topic presented in the movie is a form of advanced organizer. The learning material can be in the form of newspaper articles, a lecture, or perhaps a film. The learning task for the students is to identify central ideas and the key facts presented in the introductory material. The purpose of this model is to explain, integrate, and assimilate the material in the learning task with previously learned material.

Mike discussed three situations in which the teaching method affected his study habits. First, I asked him how he took notes when the instructor involved the class in a discussion and what types of questions he expected on the examination? He responded, "Exactly what's in the notes-- verbatim. What are the different types of this..., what are the different types of that..., etc.?" Based on the teaching method and what Mike knows about the testing procedures, he figured out what the instructor thought was important and how to use the notes in preparing for an examination.

Another example of how the teaching method affected Mike's study habits was when he suggested that

> If you attend class, listen to the lecture, and take notes, you should do fine..., and a lot of it comes from common sense.... I mean, he recognizes that some people are not theater majors, so he doesn't try to kill you with the material. I think a lot of that class is repetition for some of the theater majors.

Finally, I asked Mike how he took notes in a discussion-oriented class, in which the teacher frequently interacted with students. He responded, "I write down the terms and definitions that he uses in the experiments and from the lectures. And sometimes, those discussions end up on the test--well at least the vocabulary."

Findings Related to Participant's Locus of Control

Mike initially exhibited an external academic locus of control when measured by the MMCS. However, throughout our learning styles and teaching models discussions, Mike made statements that reflected a sense of internal control. He spoke of opportunities to adjust his behavior to improve his academic performance.

Locus of control and learning styles

An examination of our learning-styles conversations revealed statements that were reflective of a more internal academic locus of control; there were several examples in the transcripts. Mike spoke of his ability to concentrate, his consciousness of the environment, his PEPS scores on persistence and motivation, and his use of a variety of learning modes as factors that influenced his locus of control.

In terms of concentration, Mike believed his concentration was largely based on his own efforts. He admitted that he had trouble concentrating. He said, "Constantly that's just a battle going on." Mike believed that it was his own efforts, or lack there of, that was responsible for his concentration problems. He did not point to outside sources for his poor concentration. Mike said, "I'm constantly thinking how am I going to concentrate on this, because I am constantly thinking about other things and not paying attention to what I am doing."

Mike also learned from examining his learning-styles preferences that he could pay attention to how his environment may effect his ability to study efficiently. He explained a situation where he realized he was uncomfortable and took it upon himself to change his study environment. He said,

> It was one of those days when it had gotten warmer and it had got so hot that I was almost sweating Then I realized that there was no way that I could concentrate, so I had to go to another room. I went inside the information center and there it was cooler, and then I noticed that my concentration was better.

Another example of Mike's locus of control was his rejection to his PEPS scores for "persistence" and "responsibility." He believed his scores should have been much higher than the instrument indicated. Mike scored a 39 on persistence. He said, "If they are talking about whether I persistently study, then I would have to disagree with that score.... I consider myself to be pretty persistent at my school work."

He had a similar reaction to his disappointing score on "responsibility." He scored a 42 on this element. He said,

> I think that score is way too low. I should be much more closer to 60 or even beyond 60. I pretty much get my work done on time and I am pretty responsible. I would put the responsibility score more at a 63 or 65.

Finally, Mike noticed that it was difficult for him to distinguish his preferences for elements such as auditory, visual, kinesthetic, and tactile learning. He said, "I never really just paid attention to one of them." However, he admitted that for him to learn he needed to use a combination of all of these learning modalities. He said, "I need a little bit of lecture, visual, touching, and stuff that keeps me involved.... I need to do a lot of things to learn course material."

Locus of control and teaching models

Changes in Mike's locus of control that may have been attributed to his knowledge of teaching models were reflected in his statements about his preparation for examinations, the instructor's use of experiments, and his willingness to participate in classroom activities. In each case Mike's confidence in his own ability reflected an internal locus of control.

For example, I asked Mike when he would begin studying for his theater examination. He confidently responded, "I have to study only a couple of days before the exam and I can pretty much do good on it." Based on the instructor's teaching methods, Mike noted that "a lot of it comes from common sense.... I mean he [the instructor] recognizes that some people are not theater majors, so he doesn't try to kill you with the material."

Mike also pointed out that his psychology instructor encouraged the class to conduct a few experiments. These activities usually involved students learning about a psychological phenomenon by actually experimenting with them in the field. What was important here was how these activities effected Mike's locus of control. About the activities Mike said, "Well, it kinda helps me remember it, the definitions and terms and stuff like that... I write down the terms and definitions that he uses in the experiments and from the lectures."

This instructor also used in-class activities to help students learn the material. The instructor usually requested a volunteer from the class to help demonstrate a point. Mike said, "I actually like when he asks for assistance. I'm usually like one of the ones that raise my hands and I'm like, OK. And I think that helps me out a lot by participating and it is actually fun." Mike identified these activities as crucial in helping him learn the material and be successful in the class.

Summary

Mike began the study with an extremely positive attitude about the possibility of learning more about his learning styles. He recognized early that what was really important about his learning-styles preferences was simply being aware of his options. Although Mike discussed options for changing some of his study habits, he mainly emphasized how important it was for him to be aware of his options.

Mike also was able to modify some of his study habits based on the instructional model. Initially, Mike was confused about how he should take notes in his theater class. We identified the instructional model as an "advanced organizer." Based on his understanding of this model, Mike learned that the material presented at the beginning of the class was usually a broad overview of the lecture that would follow. From this understanding, he learned how to take notes that would capture the main idea of the lecture.

In terms of locus of control, Mike seemed to be developing a more internal locus of control. He spoke of opportunities where he would use awareness of his learning styles to modify study environments to suit his learning needs. He also discussed how knowledge of the instructional method helped him improve his note taking skills and understanding of the lecture. These are both characteristics of an individual who has accepted some responsibility for his academic performance (i.e., internal academic locus of control).

Case 4: Pat

Pat was an above average high school student. She earned As in all of her high school courses. She graduated among the top in her class and was accepted at several colleges.

Pat was referred to the study by her academic advisor. During the first semester, she has been identified as a student at risk for academic failure. Her advisor told her about this study and suggested that the one-on-one attention might be exactly what she needed to raise her academic standing.

Pat seemed highly motivated and stated that she wanted to be successful in college. She admitted that her first semester was a disaster. Balancing her new-found freedom and tougher academic demands proved to be problematic for her. She began college in the Pre-Med Program. Her first semester included courses such as Chemistry, Biology, English, Calculus, and Psychology. However, these courses were overwhelming, and she performed poorly.

After switching her major to psychology, Pat decided that she was going to do whatever it took to improve her academic standing. She thought her involvement in this study would give her a chance to learn more about her study habits. Her hope was that she would learn new study strategies.

Findings Related to Participant's Learning Styles

One discouraging aspect of this case was the fact that Pat neglected to complete her learning-styles journal. She just did not do it. When it was time for us to discuss her preference for these elements (i.e., pre-PEPS discussion), she was rather uncertain about her preferences for many of the elements. When we reviewed her PEPS results, Pat reluctantly agreed with some of the findings. As a matter of fact, she was surprised at her scores for quite a few elements. Interestingly, Pat seemed to grow and learn more about her preferences throughout the duration of the study. Other participants were more certain about their preferences at the beginning, but Pat learned as we went along.

Pre-PEPS discussion

After our initial meeting, we began an examination of Pat's learning styles by discussing her preferences for the 14 learning-styles elements. Pat did not complete the learning-styles journal. She preferred to discuss her preferences for these elements rather than write her responses. From our pre-PEPS discussion, two major themes emerged: (a) her understanding of her learning styles, and (b) the fact that her preference for some elements were dependent upon the subject matter.

Pat was rather uncertain about her preferences for many of the learning-styles elements. During our pre-PEPS discussion, she responded that she was either indifferent or uncertain to many of the elements. For example, she responded to her preference for temperature by stating, "For temperature, I would put my score in the middle." Moreover, when I asked her what her preference was for formal or informal learning designs, she stated, "I do both." Similarly, her preference for working alone or with a peer seemed to indicate some indecision on her part. She said,

> I guess that's different than having other people with noise in the room--as opposed to working on an assignment with somebody... so ... yeah... I guess I kinda... but not really high... I'd give it about a 60.

A final example of her lack of understanding for her learning-styles preferences was her response to the area of auditory learning. After a long pause she said, "I don't know about that one. I would put it somewhere in the middle. I would give it about a 45 or something like that."

I attributed much of her inability to articulate her understanding of her preferences to the fact that she did not complete the learning-styles journal activity. Pat was the only participant in this study who did not complete the learning-styles journal. There clearly was a difference in the conversation between students who did the journal activity and Pat who did not. In Pat's case, she neglected to do the activity and this conversation revealed her inexperience or uncertainty.

However, on a few occasions Pat did articulate a preference for a few particular elements. For learning-styles elements such as noise, light, and time of day, she clearly had a preference. For noise, on a scale of 20-80, she scored her preference for this element by stating, "I think, I think about 70." In other words, Pat preferred a lot of background noise while she studied. On the same scale, she expressed a strong preference for light when she said, "OK, light I think I would give that about a 95. I need bright light." Similarly, when I asked her what time of day she preferred to study, she responded, "No doubt... I'm definitely evening..., I mean, I'm too busy during the morning. In the evening I have much more time."

Also, during the pre-PEPS discussion, it became evident that some of Pat's preferences were contingent upon the subject matter. Pat suggested that her preference for structure--the amount of guidance and feedback from the instructor about the completion of assignments--was dependent upon the course she was taking. She said,

> Well, it depends on the class. Like a big lecture like psychology or computer information technology, we really don't have homework, so we're on our own for the test. But like Spanish that's like everyday giving us something back on how to do the assignment... So, I like it both ways.

She had a similar reaction to a question about her preference for authority figures being present while she studied. I asked her if she would like to have someone available to ask questions while she studied. She said, "Once again, it depends on the class."

Finally, I asked her if kinesthetic learning was a preference for her. She responded, "Well, it depends on what I'm doing. If it is dancing or piano, then I have to move around, I have no choice." Then I asked her if the same thing applied to studying written material. She responded, "I'd rather sit down." Once again, her preference seemed to be related to subject matter.

A summary of Pat's learning-styles preferences follows. She felt it was absolutely necessary for her to have some sound in her study area, and she preferred bright light. She seemed indifferent to temperature, as long as it was not extremely cold or hot. She also was indifferent to the design of her study area; it could be formal (i.e., desk and chair) or informal (i.e., sofa or pillows). She suggested that the amount of structure provided by her instructors was inconsequential. However, while she preferred to work with peers, she did not mind the presence of an authority figure (i.e., tutor). She was indifferent to auditory, visual, and tactile learning but she did prefer to learn things kinesthetically. She felt strongly against eating or snacking while studying. She preferred to study during the evening; all times in the morning and afternoon were unacceptable. Finally, her preference for mobility was quite low because she did not like to move around while studying.

Results of the PEPS

Three major themes emerged from this conversation: (a) the accuracy of the PEPS instrument, (b) the fact that many of her preferences were dependent upon the subject matter, and (c) the effects of learning-styles awareness on her study habits.

Pat found her PEPS results to be somewhat accurate. For example, on the Pre-PEPS, Pat indicated that she had to have some type of noise in the background while she studied. She could not concentrate in environments that were totally silent. Her PEPS score for this element was a 58, indicating that she did prefer noise while she studied. I asked her how she felt about the accuracy of that score and where she studied to create this environment, and she replied, "Ummh, it's about right.... I'm in my room with the TV on.... But, I don't want to be studying with people. I find people to be a distraction."

Another example of the consistency between Pat's pre-PEPS predictions and her PEPS results was in her preference for temperature. Initially, Pat indicated that she was indifferent to this element. She predicted her score would be about 46, and the PEPS gave her a 46 for this element. Pat said, "Oohh, this is exactly right. What I predicted is exactly the same thing. Wow!"

A final example of the similarities between Pat's predictions and the PEPS results occurred when we examined her score for the need for authority figures. Pat initially indicated that she preferred to work with a tutor or the instructor when completing difficult assignments. Her PEPS results were similar. Her score for this element was a 60. Pat agreed with this assessment and said, "That's what I put down."

Another theme that emerged from reviewing the PEPS results was that many of Pat's preferences were dependent on the learning experiences and support systems provided by her instructors. For example, her preference for structure--guidance and feedback from one's instructors--was dependent on the subject matter. She said,

> Because I know, like, with psychology..., I know that if he gives me a quiz all the time..., all this constant feedback that we had to keep up at this certain pace, I wouldn't like it. I want to read at my own pace.... I don't want to read certain amounts at certain times. But, at the same time, Spanish, I want constant feedback. You can't just cram for a Spanish test like I am doing for psychology right now. You have to get it..., you have to add on and build up.

Pat's preference for working alone or with peers was also dependent on the subject matter. She differentiated the times she worked best alone or with peers. If she did not understand the material, she would want to work with a peer:

> The only time I want to work with other people is if it's something I don't understand, like a study group.... I do learn better that way than I would if I were sitting in my room trying to figure it out myself.

However, in cases in which she did understand the material, Pat's preference for working with others is different. She said,

> But, I think at something that I already know or I can do on my own, I really don't need other people around to help me do it; then I would rather be alone. Otherwise, other people would be a distraction.

Perhaps the most important aspect of this case was the effect of learning-styles awareness on Pat's study habits. During our discussion of her PEPS results, she told me how this awareness had affected her study habits. For example, Pat initially indicated that she had a strong preference for bright light in her study environment. Her PEPS results concurred with this preference; she scored a 66 on this element. Her awareness of this preference affected how she sets up her study environment. It has now become a habit for her to adjust the lighting in her study environment.

When I asked her to describe how she used lighting in her study environment, she said,

> In my room..., yeah, I use natural sun light, and sometimes when the sun is not out real bright, I'll turn on every single light in the room. Yep, every single light in the room. The over-head light near me, the one above the mirror, the television, the room light, and my roommate's light by her bed. I just turn them all on.

Pat also indicated that she was indifferent to studying in formal or informal settings. Formal settings are sitting at a desk with a chair. An informal setting may be sitting on soft pillows, a couch, or a bean bag on the floor. Pat initially indicated that she could study in either one of these environments. However, as she began to reflect more on this preference, she began to notice that her preference was more informal than formal. She said,

> Well, lately I think I am getting more and more informal. Like I used to always study in the study in our room. But now I'm more and more finding myself studying on the couch in my room in front of the television. I'm more and more doing that. That's where I read my psychology..., where I was studying today on that couch with the stereo on.

Her awareness of the time of day she preferred to study has also affected her study habits. Pat definitely preferred to study during the evenings. She did not like studying in the morning. About studying in the morning, she said,

> Only when I'm, like, cramming. Like, I am studying psychology in the morning now. I don't like to; I'm being forced to..., it's too early. And usually if I have to study in the morning, it's because I'm cramming. It reminds me too much of high school..., so, I only study in the morning if I have to. If I have no choice. That's why I'll do it then.

Findings Related to Instructor's Model of Teaching

Pat responded to verbal questions that assisted in identifying the teaching model being used in the course. She chose to discuss a mathematics class in which she was having difficulty. To identify the teaching model, I asked her to describe what was going on in class; then I observed the class.

I asked Pat if the instructor used a lecture or discussion format. She responded, "It's 85% lecture. He'll ask questions once in a while..., like how many of these...; you don't raise your hand, he just expects people to answer. It's mostly lecture and very little discussion."

I asked Pat if there were any handouts or supplemental materials distributed during these lectures. She responded,

> No, what he does is..., he like, had a little pink book that we got from Alpha Graphics across the street, and he just uses the exact same things that are in that book, and he just turns them into slides. And he never uses the chalkboard; he just uses the slides--the computer slides.

I observed the class myself and noticed that the instructor lectured primarily from the course packet. The packet contained sample problems that he worked through in class. He used a computer projection to solve the problems step-by-step. Students were encouraged to follow along in their course packets. There was rarely any deviation from the problems in the course packet. Students rarely raised their hands to ask questions, and the instructor did not stop to ask students if they had any questions. The pace was rapid. Students were given weekly homework assignments, which were supposed to be completed in a week. However, they were never collected or graded by the professor.

When I asked Pat if these lectures helped her prepare for the course, she said, "well not a whole lot. Because, like I said, everything that he lectures on, I have in the book and I can go over myself."

Based on my observations and Pat's description of the teaching methods, it appeared that the instructor used "direct instruction." The "direct instruction" model is characterized by teacher direction and control. The teacher selects and directs the learning tasks and maintains a central role during instruction (Joyce & Weil, 1996).

Effects of teaching method on study habits

We discussed Pat's description of the class and my observations. Since the teaching method was so didactic, it seemed difficult to identify study strategies that would make learning the material easier.

I told Pat that the primary objective of the direct-instruction model was to maximize student learning time. Therefore, she could expect the instructor to cover large amounts of material during a single lecture. I also pointed out that the instructor used the course packet as a vehicle to compress large amounts of material so that he could deliver this information within the semester. I suggested to her that if she understood the problems in the course packet, then she would probably be in a good position to perform well in the course.

Although it was difficult to suggest what changes Pat could make in her study habits, based on my own experience, I suggested that she repeatedly work sample problems. Second, in the absence of timely and extensive corrective feedback, the "direct instruction" model does not offer students definitive cues about what changes in their study habits would be most helpful. When I asked her how these observations would help her prepare for examinations in this class, she said,

> Well, not a whole lot. Because, like I said, everything that he lectures on I have in the book and I can go over myself. So, basically, I have to prepare myself. If even like a practice test he could put in the back, that would be helpful. So, I don't see the point in going to the lectures.

Findings Related to Participant's Locus of Control

An examination of Pat's learning-styles and teaching-models discussions did not reveal conclusive evidence as to whether or not Pat had adopted a more internal or external academic locus of control. In some cases, her statements continued to reflect an external academic locus of control. She also made statements that were indicative of a more internal locus of control.

Locus of control and learning styles

In some cases, Pat spoke of learning-styles elements in terms of her ability to control them and use them to her academic advantage. In other cases, she spoke of other elements as being external to her control, and therefore, detrimental to her ability to study and concentrate. She continued to express characteristics of both internal and external academic locus of control.

For example, Pat explained that her preference for structure and persistence depended on the class or subject matter. About Pat's preference for structure, she suggested that it "...depends on the class." Pat explained that in a class where she was expected to perform about once per month on an examination (e.g., psychology), she did not want a lot of structure from her professor. However, in a class where Pat was expected to perform daily (e.g., Spanish), she expected and wanted a high degree of structure from her instructor. Her preference for this element seemed to be externally controlled. Similarly, her persistence also seemed to be externally controlled. About her persistence she said,

> Well it depends on what the subject is. Sometimes I have so much self-motivation like I am going to get it done..., other times I feel so stupid that I don't know what to do and I need someone to push me.

Other examples of statements that were characteristic of an external academic locus of control were Pat's preferences for sound and lighting. Pat suggested that the sound of a television may have served as a distraction while she was studying. However, the sound of a radio was motivational. She said,

> Sometimes the TV can also be a distraction. Like if it's something I want to watch, then I'll keep looking at it.... That's why I prefer music over

> the TV, it has to be music I like..., it'll motivate me to work harder.

Pat also expressed that the lighting may effect her mood, and therefore, her ability to study. She said, "I get depressed when the clouds won't let the light come through." If she attempted to study in dim light, she said, "I would fall asleep." She suggested that the dim lighting in her mathematics class was partially responsible for her difficulty in that class. She said, "it's too dark.... The shades are all shut, there is no sunlight coming in. If he just opened the shades, I'd be doing better."

However, Pat did express a level of internal locus of control in her statements about her level of motivation and responsibility. She predicted that she would score well above 60 on scales such as motivation and responsibility. In other words, Pat thought her motivation for academic work was high. I asked her what made her so motivated. She said, "My determination to get a 3.5 grade point average." She also predicted she would score high on responsibility. She said her score would be high because, "I [Pat] know what I'm supposed to be doing."

Pat also commented on her ability to adapt to different learning situations. She thought her ability to work with structure or no structure, alone or with a peer, and with an authority figure, were characteristics of her ability to adapt to a variety of situations. These statements were reflective of a more internal academic locus of control. She said,

> I can adapt to whatever I have to do. If I have to work with peers..., I can go ahead and work with peers and that'll be all right. If I want structure and there isn't any, I can adapt to that.

Locus of control and teaching models

In terms of the effects of knowledge of teaching models on Pat's locus of control, it appeared as if she remained external. Pat placed the responsibility for her learning in the hands of her instructor. She was willing to allow him to guide her through the learning process. She was reluctant to suggest that anything she might do may influence her ability to learn the material.

Pat complained about having difficulty understanding what was going on during the lecture. I asked her if the instructor expected the class to have the reading assignment done prior to them attending class. She respond, "He doesn't really tell us." I also asked if it would be a good idea for her to take it upon herself to read the assignment anyway. She replied, "I don't think so."

Here is another example of Pat's unwillingness to take control of her learning. Her instructor provided an outline of the lecture at the beginning of each class. I asked Pat how would she use the outline to prepare for exams. She said, "I haven't really. I basically only use them in the class."

Summary

Pat expressed some uncertainty about her learning-styles preferences at the beginning of the study. She eventually began to understand her preferences as she began experimenting with and reflecting on the elements. Throughout the course of the study Pat gained a deeper understanding of her learning-styles preferences. In some cases, Pat reported changes in her study habits that were contributed to her understanding of her learning-styles preferences.

We were less successful transforming knowledge of teaching methods into effective study habits. One reason may be that the instructional model (i.e., direct instruction) was not as accommodating to our objectives. Another factor was that we were attempting to develop alternative study habits for a mathematics class. The only strategy we could develop was to work as many practice problems as possible. In effect, Pat's study habits did not change based on her knowledge of the teaching model.

There was evidence to indicate that Pat's academic locus of control may have shifted from an external to an internal predisposition when she became aware of her learning style preferences. Pat spoke of her ability to adapt to different environments and to work with different people to accomplish her goals. However, Pat's knowledge of teaching models did not seem to effect her locus of control. As a matter of fact, she seemed to cling on to the idea that it was her professors' responsibility to guide her through the learning process.

Case 5: Tony

Tony was an excellent participant. He attended all of our meetings, and he arrived on time. His questions were good and I could tell he wanted to learn more about himself as a learner. Anything that was asked of him he did without hesitation. All of his assignments (i.e., journal activity, pre-PEPS grid) were completed in a timely and thorough manner.

He attended summer school immediately after he graduated from high school. His first summer he took two college-level courses and earned a B in both. He said, "I took the fall semester for granted because I did so good in the summer. I thought the Fall was gonna be easy like the summer was. But taking 12 hours was a whole different story." Tony ended up on the at-risk list after his first fall semester.

Tony seemed sincere in his desire to do better during the spring semester. His academic advisor warned him that if he did not do better, he might have to take a leave of absence for one semester. Without continuous enrollment, he would be unable to get into the degree program that he wanted. She suggested that he participate in this study because he met the criteria, and more importantly, he had the potential to do well in college and improve his poor study habits. He said,

> I just need to fix up on my study skills, and I'll be all right. I just didn't know how to study for so many classes. I mean, I had a lot of reading and assignments to do in all of my classes; I couldn't keep up.

Findings Related to Participant's Learning Styles

Tony began the examination of his learning-styles preference with strong convictions about his preferences for particular elements. He was at one extreme of the scale or the other; few of his responses were in the middle. He frequently reflected on past learning experiences when responding to his preference for these elements. His journal responses were typed and at least a paragraph in length. He was very expressive in his journal and during our conversations.

But, when it was time to compare his journal responses, pre-PEPS discussion, and PEPS results, a few contradictions surfaced.

Pre-PEPS discussion

After completing the pre-PEPS grid, we discussed his preferences for the 14 learning-styles elements. In our discussion he expressed a definite preference, either for or against, most elements. However, there were a few elements for which he stated that he was indifferent or lacked an awareness.

He stated he had a preference for or against noise, light, temperature, design, studying alone or with peers, tactile learning, kinesthetic learning, time of day, and mobility. Specifically, he indicated he preferred his study environment to be quiet, to have bright lighting, to have a cool temperature, and to be formal. He preferred to work alone rather than with a peer. He did not like auditory or kinesthetic learning, but he did like to be able to touch things while he was learning them (tactile learning). He did not like to eat while studying (intake). His best hours of the day to get work done were during the morning.

Tony preferred to study in quiet areas. However, he could deal with some noise in his study environment; it was dependent on what type of noise it was. He said,

> Well, I don't like music while I'm studying. Especially if I can hear the words, then I just start singing the song, and that is a distraction. But, I can deal with noise like cars and people and stuff like that, just passing by. As long as I can't understand what the people are saying or as long as the car or whatever is making that noise is not extremely loud, you know.

When deciding a preference for or against an element, he usually reflected on a previous learning experience to help him. Keep in mind that Tony had not experimented with many of these elements before. It would be interesting to see if any of his preferences changed after he had experimented briefly with these elements. Here is one more example of Tony's preference for tactile learning:

> I like handling things with my hands. Like, in high school, I had this chemistry class that we had to mix these chemicals and compounds and stuff and put them over the heat burning thing. The heated chemicals would produce this gas, and the gas was another element that we were suppose to learn. I learned a lot about the elements by mixing them like that. So, I like tactile.

There were a few elements that Tony expressed he was either indifferent toward or was uncertain about his preference. Those elements included his preference for structure, working with authority figures, and visual and auditory learning. When asked about his preference for visual learning, he said,

> Well, like the other one [auditory learning], I just hadn't thought about that much either. I don't think I would like to just look at it and learn from it. I'd probably need, like, a combination of seeing and hearing to really be helpful for me. But for visual, I'd give myself like a 50. I'm not too sure about that one.

Discussion of learning-styles journal

Tony completed his learning-styles journal in one week. He disliked his handwriting, so he typed his responses. His typed responses were easy to read and they were much longer than the other participants' responses. They ranged in length from five to ten sentences. Many of his journal entries matched the responses he made during our pre-PEPS discussion, but now these responses were backed up by life experiences. For example, his preference for elements such as noise, light, temperature, working alone, not eating while studying, studying in the morning, and sitting still while studying all were the same as he initially suggested during the pre-PEPS discussion.

For example, during our pre-PEPS discussion Tony indicated that he did not like to eat while he was studying. After experimenting with this element, he recorded this statement in his journal:

> I experimented with this one. I learned that I cannot eat while I am trying to study. I tried to eat a bag of chips while I was doing my math homework. I could not concentrate on the problems and eat the chips. I was always thinking about how the chips tasted and how greasy the chips were. I did not like writing on the paper and getting the grease on the paper from the chips. And then I tried having something to drink while I was studying. That worked because it did not make a mess. But I was still distracted from time to time drinking. Now I know the best way for me to study is without any food or drinks around me.

However, Tony's preferences for visual, tactile, and auditory learning did change after he experimented with them. For example, he initially stated that he was indifferent to visual learning. After experimenting with this element, he noted,

> I think I have a pretty strong visual preference. I can't just hear the lecture. I think I need to see stuff, too. I like to learn from diagrams, slides, and other color photos of stuff. It seems like when information is presented to me visually, I can recall it better because the picture stays in my mind longer. During the exam I think about the pictures I can remember and that helps me answer questions.

He also changed his mind about tactile learning. Initially, he indicated that he preferred learning things by touching them. After examining his preference for this element during this journal activity, Tony changed his mind. He said,

> I don't know about this one. I don't think there is anything that I learn or learned that was tactile. I don't have a preference for working on things with my hands. As a matter of fact, I hate working with my hands. Unless it is writing or something like that. I don't like fixing or building stuff. It just seems so confusing to me

> to have to read the directions and stuff like that and then try to put the thing together with your hands. I would prefer to read the directions to somebody else and let them put it together.

Results of the PEPS

The results (Appendix J) from the learning-styles inventory appeared to corroborate Tony's feelings about his preferences for particular learning-styles elements. For example, his preferences for formal study and time of day were just as he had predicted. During our pre-PEPS discussion, Tony suggested that he preferred formal learning environments. His PEPS score of 65 matched his initial assessment. When I asked him how he felt about this score, he said,

> Well, that's about right. Even when I experimented with that one..., I tried to study in my bed and on the sofa. I couldn't study for long there. In my bed, I got like too comfortable and I started getting sleepy. On the sofa, I couldn't get comfortable holding on to my book and trying to take notes out of it. I kept on thinking, "boy, I need to be at a desk or something."

About his preference for time of day to study, Tony initially indicated that he preferred to study in the morning. His PEPS score was 67 and substantiated that he had a very strong preference for studying in the morning rather than evening. I asked him why he did not like studying in the evening, and he responded,

> That's just too late for me. I'm so tired by that time in the day that I can't really get any work done. By the time I get to all my classes, work,

> meetings, practice, work-out, and run errands, I'm exhausted. I don't feel like doing nothing but watch TV at night. Sometimes, I might go to the tutor because that's the only time that she's available. But if I had my choice, I'd do everything first thing in the morning. When I study in the morning now, I don't have to worry about studying late at night. I just relax at night and do whatever. If I want to study, then I'll do that.

However, some of the PEPS results seemed to contradict Tony's pre-PEPS predictions. His preferences for elements such as auditory learning, visual learning, and kinesthetic learning were different from what he had indicated in his journal and pre-PEPS discussion.

For example, Tony scored a 67 on the learning-styles element for auditory learning. He was surprised by this score because he initially indicated that he did not prefer learning things by hearing them.

> The PEPS gave me a 67 for auditory learning. Wow!! That surprises me. I didn't think that I was that auditory.... I mean, just hearing ain't enough for me. I usually need other stuff. I kinda thought I'd be indifferent about learning stuff by hearing. I sometimes forget stuff that I hear, so I figured that would not be a strong spot for me. I wonder how they came up with that score.

Auditory, visual, tactile, and kinesthetic learning were areas for which Tony had difficulty assessing his preference. His pre-PEPS discussion, journal entries, and PEPS results were not consistent for these elements. He was having a difficult time figuring out exactly which ones of these elements were his preferred learning modes.

For example, his preference for tactile learning was different each time I spoke with him. In our pre-PEPS discussion, he said about tactile learning, "now that I'd probably enjoy more. I like handling things with my hands.... I like tactile." After experimenting with the element, he noted in his journal, "I don't think there is anything that I learn or learned that was tactile.... As a matter of fact, I hate working with my hands." His PEPS results for this element scored him at a 48, meaning that he was indifferent to his preference for this element. When I asked him about how he felt about this score, he said,

> Now, you see, I would have expected that to be my strong point. I like learning stuff by touching it. Like, I like mixing and pouring stuff in class. But I don't like fixing furniture and cars and stuff like that. But, in class I don't mind playing with models or figures that help me learn what's going on.

When I brought to his attention that his preferences for these elements were inconsistent, he responded,

> Just seeing it would not be good for me. I need to, like, to see it and touch it and hear it and stuff like that. I need, like, a combination of all those things. There should be one with a combination, like a learning style for people who have a bunch of different preferences.

Findings Related to Instructor's Model of Teaching

Prior to my initial observation of Tony's accounting class, I asked him to describe his instructor's teaching method. I asked if the instructor used a lecture or discussion format. Tony responded, "We don't take that many notes while we're in class. The class is, like, a lot of participation from everybody. Sometimes, it seems, like, we're just talking. I would say its more discussion."

Tony also described weekly homework assignments. When the instructor returned the assignments, he provided feedback to let the students know how they were progressing in the class. Classroom discussions were guided by an outline and problems that the instructor assigned from the textbook. Handouts were used frequently.

Tony showed me one of the outlines that the instructor used in a classroom discussion. The outline was at least 10 pages long. I asked him if this was for one classroom session, and he said "Yeah, and sometimes any one of these topics he [the instructor] might have another packet talking about that specific point alone." Since so much of the course was based on handouts in the class, I asked how the textbook was used. Tony responded, "We do problems in the textbook." However, he also admitted that he did not read the textbook much.

Tony's major problem in his accounting class was remembering the material. So many topics were being covered daily that sometimes it was difficult for him to keep up. Tony said, "I just have a hard time remembering all the information in there." When I asked Tony what the best way was for him to prepare for examinations in this class, he responded, "repetition."

Tony chose to discuss his accounting class because he was having difficulty succeeding on examinations in this class. He saw a great deal of discrepancy between the homework questions, which he usually had no problems completing, and the examination questions. He said,

> You see, the thing that gets me on some of these problems is the format that he uses. Because, I understand the questions that he gives on the homework but just the exam questions he changes the format and adds a lot of other things to the problems.

Following our pre-observation conversation, I observed the accounting class. Tony's description of the class was rather accurate. The discussion format, the outline, the use of the textbook, and the role of the students and instructor were just as he described.

In addition, I noticed a few other things. I noticed the instructor began the class by presenting students with a problem; the outline, textbook, and classroom discussion were all designed to help them identify a method to solve problems. The main objective was for students to develop their own methods for solving problems. Students spent most of the time in class working in small groups. They reviewed the outline and the assigned textbook chapter. Their assignment was to develop a method to solve the problem before the end of class, and each group was asked to present their method.

Based on Tony's description of the class and my observations, I concluded that the instructor was using the "inquiry training model." Joyce and Weil (1996) state, "the objective of this teaching method [is] to involve students in a genuine problem of inquiry by confronting them with an area of investigation, helping them identify a conceptual or methodological problem within that area of investigation, and inviting them to design ways of overcoming that problem" (p. 187).

The model involves a cooperative, rigorous climate. Students become a community of co-workers who try to solve the same problem. The role of the students is to hypothesize, challenge evidence, and criticize other designs (Joyce & Weil, 1996). The instructor's task is to nurture the process of inquiry and encourage students to reflect on that process.

In our post-observation meetings, we discussed what type of changes in study habits Tony needed to make in order to improve his performance in this class. We discussed the problem he had with the format of examination questions. Several suggestions involved changes in study strategies. I asked Tony what he thought he needed to do to be more productive on examinations in this class. He suggested,

> Well, I understand what he's doing in the lecture. I just need to find a way to take better notes and be more prepared when I get to the lecture. Most of the time, he's talking about something and I have no idea what he's talking about.

Since the instructor rarely took time to discuss problems from the textbook, Tony and I discussed if it would be a good idea for him to read the textbook assignment before attending class. Tony decided that he would create flash cards from the material he read in the textbook. On these flash cards he would write important terms, concepts, and definitions that appeared in the textbook. This strategy proved to be effective. He said,

> Before, I used the wrong strategy. I didn't read before the class. I would try to read to cover up the old stuff. I found that I was trying to go back and read old material, and I did not pay much attention to what was in the lecture today.... Now, I read ahead and I can keep up in the lecture

> with what the teacher is saying. I read the textbook, I take notes from the textbook, and then I go to the lecture and check my notes against what the teacher is lecturing. Then, all day long, I am flipping through these flash cards.

Tony was so pleased by how successful this strategy was that he decided to use it in other classes. For his accounting class, it worked perfectly. However, he soon realized that some teaching methods did not seem to coincide with this strategy.

> The only difference is that some of the teachers don't lecture straight out of the book like this one. I can follow his lecture better from the textbook. The other teachers go all over the place..., they might start with one topic, and then I expect the next topic in the textbook to come up next and it doesn't. They start talking about a topic that is in another chapter or something. There is just no order to those lectures, and I get lost.

By incorporating these changes in his study habits, Tony's motivation to study was renewed and his level of confidence grew. For example, he described one of the new habits he developed,

> I'm just gonna write them down and highlight the information in the notes and in the textbook and study that. And then I will review questions from his other multiple choice exams to give me some idea about what he might ask next.

I also noticed a change in Tony's motivation. When Tony learned how to study and prepare for this class, he felt better about his chances for success. He said,

> I feel better; I feel much better. I should have been doing this the whole semester. I would have felt even more better. I could have done better on those other two exams. Because, I could not understand how I could not remember all of the material and I could not take those multiple choice exams that he was giving.

His confidence grew tremendously from this new learning experience. I asked him if he thought the final examination in this class would give him any problems. He responded,

> I don't think that will be too much of a problem for me. Because, now I'll be tested on the material that I have. I have the information now. Before I used to be trying to catch-up with the lectures. So, by the exam, I would be trying to read the material as fast as I can and go to another chapter, and by the end of the day my mind is all mixed up. But now, with these cards, it's like I have the whole chapter in my hand.

Findings Related to Participant's Locus of Control

It appeared as if Tony's academic locus of control was effected by an increased understanding of his instructors' models of teaching. However, there was not enough evidence to indicate how his locus of control was effected by knowledge of his learning-styles preferences. Tony theorized how knowledge of instructional models would help him perform better in some of his classes. There were not enough examples to draw a clear picture as to how knowledge of Tony's learning styles may have effected his locus of control.

Locus of control and learning styles

Part of the reason I was unable to assess the effects of learning-styles awareness on Tony's locus of control was due the fact that Tony never really made any statements that indicated how or what he would change about his study habits. Tony explained his preferences, although there were some contradictions when the PEPS results arrived, but he did not suggest that he felt more or less in control of his situation based on this knowledge.

Locus of control and teaching models

Tony exhibited a more internal locus of control when we discussed his reaction to learning about the teaching model. Tony was frustrated by the difficulty of taking notes in his accounting class. Once we identified the instructional model as "inquiry training" and developed a study strategy for keeping up with the lecture material, Tony realized he had the ability to improve his performance in this class. He said, "Before, I used the wrong strategy. I didn't read before the class.... now, I read ahead and I can keep up in the lecture with what the teacher is saying." This is evidence of a more internal academic locus of control.

Summary

Tony began the study with a great deal of understanding about his learning-styles preferences. Many of these preferences he already used in his study habits. For example, Tony was already aware of his preference for bright lighting, quite study areas, studying in formal areas, and working alone. Prior to his participation in this study, he took those things into consideration while studying. Many of the things I hoped Tony would learn about his learning-styles preferences and study habits, he already knew.

Our discussion of teaching models certainly gave Tony another skill to add to his repertoire. Perhaps his greatest learning experience from participation in this study involved his understanding of the use of teaching models to help improve his study habits. Understanding the model helped Tony take better notes. He also decided to change his study habit by reading his textbook assignment prior to attending class rather than after class. This helped improve his comprehension of the lecture.

There was nothing to indicate that Tony's locus of control may have been changed by his awareness of his learning-styles preferences. However, knowledge of the instructional model did reveal a possible shift in his academic locus of control. When Tony began to understand what the instructor was doing, he spoke of increased motivation and excitement by the prospect of being academically successful in this class.

DISCUSSION

This study has described how students' awareness of their learning styles and knowledge of their instructor's teaching models have effected their study habits. A secondary objective of this study was to examine the effects of this knowledge on students' locus of control. For one academic semester, the researcher met individually with five students. At each meeting, the researcher encouraged students to use information about their learning-styles preferences and teaching models to improve their study habits. The data was collected and analyzed using a multiple-case study design. The results of this study revealed that each of the participants was able to describe improvements he or she would make in his or her study habits.

The objective of this chapter is to: (a) discuss the findings related to the research questions, (b) examine the implications of this study, and (c) suggest recommendations for further research.

Findings Related to Research Questions

The first research question was: How do students at-risk for academic failure incorporate an awareness of their learning style into their study habits?

In each case (i.e., Dan, Jen, Mike, Pat, and Tony), participants discussed changes they had made in their study habits associated with an understanding of their learning styles. This experience allowed students to examine their preferences for particular learning-styles elements. Most of them experienced improved concentration and comprehension when they made accommodations for their learning-styles preferences while studying.

For example, Tony initially discussed his preference for noise in the background while he was studying. He indicated that he did not mind having a little noise in his study environment. However, after experimenting with this element, he noticed that he was distracted by background noise. He then decided to experiment with studying in absolutely quiet areas (e.g., the library). He learned that while studying in quiet areas, his concentration was much better.

Some participants suggested that an awareness of their learning styles was a valuable tool in helping them improve their study habits. For example, Dan recognized that reflecting on his learning preferences was helpful when he noticed his concentration was wandering. He said, "I'm not always clear to where I lie on each thing, but it's good to know what they are so I can pay more attention." Mike had a similar experience. He said, "What I have decided after doing all of this is that the most important thing to me is being aware of what these factors are, how they hinder my concentration, and if I notice that my concentration is hindered, what I can do about changing it."

Miller et al. (1987) suggested that "from a learning style perspective, one of the major educational objectives is to teach students how to learn and how to manage and monitor their selection and use of various learning styles and strategies" (p. 399). The findings in this study suggest that the learning-styles intervention in this study helped these students learn more about themselves as learners. By analyzing and making accommodations where necessary, students were able to improve their study habits.

The second research question was: How do students at risk for academic failure incorporate an understanding of teaching models into their study habits? An examination of the transcripts revealed that students can learn to use knowledge of teaching methods to improve their study habits. In some cases, understanding the teaching model helped students consider how to change the ways they prepared for class. For example, Dan's Spanish instructor used a "direct instruction" method of teaching. The course was fast paced, and students were responsible for having read the material. This influenced Dan's study habit by forcing him to read his textbook assignment ahead of time.

Similarly, Tony's instructor used an "inquiry training" model. The instructor initiated the lecture by presenting a problem, requested that students develop a methodological approach, and then present their solutions to the class. Tony decided to change his study habits so he would be prepared for this class. He decided to take notes from the textbook prior to attending the class lecture. That way, he had already reflected on the problem before it was presented in class. He described his strategy, "I read the textbook, I take notes from the textbook, and then I go to the lecture and check my notes against what the teacher is lecturing. I can keep up now. I am no longer lost." For Tony, this proved to be an extremely empowering experience. Knowledge of teaching models can help students change their study habits and become more effective classroom learners.

The third research question was: How does a personal awareness of learning styles change students' academic locus of control? On several occasions students indicated changes they would make in their study habits based on the understanding of their particular learning-styles preferences. This would suggest that these students had begun to realize that their academic situation was within their control, or at least their preparation for academic tasks. For example, Pat strongly believed that she studied best in environments that were well lit. She suggested that if the environment was not well lit, she would not be able to concentrate. She said, "I'll turn on every single light in the room..., the over-head light near me, the one above the mirror, the television, the room light, and my roommate's light by her bed. I just turn them all on."

Dan, Mike, and Pat each gradually exhibited characteristics of individuals who were more internally controlled based on their understanding of their learning-styles preferences. For example, Dan spoke about his ability to control the noise in his study environment "now I know that I can get rid of those distractions. And it helps you kinda find your environment out so that you can study more efficiently." Similarly, Mike and Pat spoke of ways they would alter their study environment in ways that would improve their concentration. They realized that their learning was within their control.

Jen, on the other hand, seemed to remain externally controlled. She often viewed her academic failures or low motivation as factors beyond her control. She said "When I am doing good in school, my motivation is high. But when I am not doing good, then my motivation is low.... and sometimes it depends on the subject." She may have gained a better understanding of her learning-styles preferences, but this information did not influence her study habits.

The fourth research question was: How does an understanding of teaching models change students' academic locus of control? Although analyzing the findings related to this question was more difficult to assess, from the interview transcripts, it appeared as if students began to realize their instructors' teaching models presented opportunities for them to study more effectively. Students described situations where their understanding of the teaching model helped them feel more confident about the lectured material and what was expected of them. Dan, Mike, and Tony each exhibited a more internally controlled predisposition when discussing this matter. They each spoke of the benefits associated with understanding the teaching model. For example, Dan noted that his understanding of the teaching model helped him improve his thinking process when completing class assignments. Mike suggested that the understanding the teaching model helped him prepare for examinations and participate in classroom discussions. Tony developed a study technique based on the teaching model.

However, Jen and Pat tended to remain relatively external regarding the effect of knowledge of teaching models on their academic locus of control. They clung to the notion that much of their academic difficulties were related to "the boring instructor" or "the stupid textbook."

Overall, these findings suggested that students' emergent understanding of teaching models contributed to their demonstration of behaviors that are congruent with an internal locus of control. Elements of a model, that emerged from the findings, may be used to guide the work that study-skills instructors do. These elements, highlight the importance of the following explicit instructional strategies, (a) ask students to describe their learning-styles preferences in journals, (b) discuss and educated students about their actual learning styles, and (c) encourage students to modify their study habits.

Implications of the Study

This study supports the notion that conducting learning-styles research may be beneficial for students at risk. In this study, students described changes they would make in their study habits based on an increased understanding of their particular learning-style preferences and their instructor's model of teaching. By reflecting on their preferences and learning options, they began to make decisions about their study habits and behaviors. By observing their instructors' teaching models, they began to understand how they could use this knowledge to improve their comprehension of lectured material.

These decisions and behaviors also represent a change in students' academic locus of control. Initially, these students exhibited an external locus of control, as measured by a locus of control instrument (i.e., MMCS). However, during the course of the study, they began describing how they could take control of their academic situation by making changes in their study habits, learning environments, and attending to their particular learning-styles needs. These decisions were symbolic of students who had accepted responsibility for their academic success or failure, and they were willing to take actions to influence these results (i.e., internal locus of control).

Some elements of a model appear to have emerged from the findings. This model may be used to guide the work of study-skills instructors in higher education. The steps of the model include: (a) educating students about their options regarding learning-styles elements;

(b) creating an environment where they could express their preferences either verbally or written; and (c) encouraging them to modify their study habits based on their understanding of their preferences.

Recommendations

Researchers in higher education have neglected to investigate thoroughly the educational potential of learning-style research and teaching models for student learning. Further research should be conducted to investigate (a) advancements in learning improvement programs, (b) student development programming and retention efforts, (c) the incorporation of learning-style research in the study-skills curriculum, (d) the effects of teaching models on students' study habits, and (e) alternative research designs.

Miller et al. (1987) concluded from their study of the effects of learning-styles training on college students that "student development programs and services designed to improve academic achievement should address the relationships between learning style and achievement" (p. 404). Learning improvement programs should consider students' individual characteristics when prescribing effective study strategies. Often these programs conform to a one-size-fits-all mentality. That approach ignores students' individual learning needs. However, a learning-style perspective would highlight these individual needs.

Matthews (1991) suggested that "one major educational objective was to teach students how to learn and how to manage and monitor their selection and use of various learning styles and strategies" (p. 265). This educational objective could be developed by providing students with the services to assess their learning styles and advisement on how they should adjust their study habits to accommodate their preferences. These services should be included in campus learning resource centers.

More research should also be conducted on the use of learning-styles research in the development of retention programs. Students in these programs may form an understanding of their learning needs and their instructors' teaching models. Nelson's et al. (1993) study recommended that "learning style preferences should be considered in the design of retention programs" (p. 368). In their study, a learning-styles intervention program was introduced to a selected group of students. Eighty-three percent of the experimental cohort were retained, compared to 77% in the control cohort. Improved retention figures were contributed to (a) students' positive feelings about possessing a tool that empowered them, and (b) students studying in ways congruent with their individual learning styles.

Retention programs could improve their services by considering students' learning styles.

Another valuable research initiative would be to incorporate learning-styles awareness and knowledge of teaching models into a college-study-skills course. Just as note-taking, time management, and test taking are essential skills taught in study-skills courses, learning-styles awareness and teaching models also could become valuable learning strategies. Fleming and Mills (1992) suggested that "the most realistic approach to the accommodation of learning styles in higher education should involve empowering students through knowledge of their own learning styles to adjust their learning behavior to the learning programs they encounter" (p. 138). Teaching students about themselves as learners and encouraging them to use their learning-styles preference as learning strategies, is possibly the best approach to incorporating this information into the learning process.

The effects of instructors' teaching methods on students' study habits also should be examined. Professors should be aware that students' learning and study habits are heavily influenced by how they structure their courses. For example, participants in this study noted that the structure, or lack of structure, the professor created for the course often guided how they would approach the reading and preparation. If the course was demanding and required frequent participation, then the students were more inclined to read and complete the assignments ahead of time. On the other hand, in classes where there was very little structure and students' feedback was not expected (e.g., lecture), students tended not to prepare for these classes as well as they may have for others.

Conti and Welborn's (1986) study supported the recommendation that more research should be conducted on the relationship between models of teaching and students' study habits. They found that teaching styles had a significant effect on student behavior and subsequent achievement. Students of teachers with a teacher-centered approach achieved less than students of teachers with a student-centered approach. They said, "the students of the teachers who moderately supported the collaborative mode demonstrated the greatest amount of achievement of all students in the study" (p. 21).

Researchers who intend to duplicate this study may want to consider alternative research designs. The researcher's interactions with participants in this study may have positively contributed to changes in their study habits and locus of control. Therefore, readers should examine these findings with the notion that these interactions may have also contributed to changes in participants' study habits and locus of control. Acknowledging that the researcher's interactions may have contributed to students' desire to change their study habits, future studies may be designed so that the researcher observes another individual working with the participants in the study. In this type of study, the researcher would become a non-participant observer. This design would help to minimize the potential of the researcher's affect on participants' behaviors.

Summary

The objective of this study was to describe the effects of learning-styles awareness and knowledge of teaching models on students' study habits and locus of control. A locus-of-control instrument was used to identify the participants. Five students participated in the semester-long study. Data was collected through interviews, journals, classroom observations, and a learning-styles inventory. The data was analyzed using a multiple-case study design.

Findings demonstrated that learning-styles awareness did help students consider alternative study habits. Students also changed some of their study habits when they learned more about teaching models. The results of the study suggest that providing students with a method for examining their learning-styles preferences can improve their ability to exercise control over their own study habits. Increasing an individual's awareness of her learning styles catalyzed an analysis of her efforts toward achievement based on each student's unique traits. As a result, students who initially feared that their academic situations were beyond their control (i.e., externals) could now learn to develop skills and habits that would help them take responsibility for their own learning.

Knowledge of teaching models also served to influence students' study habits and locus of control. Students demonstrated the ability to adjust their study habits when they learned more about their instructors' teaching models. In some cases, participants chose alternative methods of preparing for the class lecture (e.g., reading prior to the lecture). In other cases, participants used this information to better understand what was going on during the lecture (e.g., paying attention to the use of visual material).

Every institution of higher education has a population of students that may be at risk for academic failure. These students are either minority, non-traditional aged, international, athletes, first-year, or posses a learning disability. Since retention experts are often looking for innovative and effective methods to retain and graduate these students at rates comparable to the larger student body, the results of this study might be instructive. It is hoped that this research will catalyze an expanding initiative related to understanding the relationship between learning-styles research and instructors' use of teaching models, and the retention and matriculation of students at risk. There is little doubt that learning-styles research and knowledge of teaching models can be used to guide and improve educational practices in higher education. Both teachers and students may benefit from further research in this area.

APPENDIX A

FAMILY OF MODELS

Family	Objective	Models
Social Family	capitalizes on our nature as social creatures to further learning and to expand our ability to relate to one another	• partners in learning • role play • jurisprudential inquiry • individual differences • discussion
Information processing	emphasizes ways of enhancing the human being's innate drive to make sense of the world by acquiring and organizing data, sensing problems and generating solutions to them, and developing concepts	• thinking inductively • attaining concepts • concept development • scientific inquiry • memorization • synectics • advance organizers • developing the intellect • expository learning • guided discovery • inquiry • lecture
Personal family	shapes education so that students understand themselves better, take responsibility for their education, and learn to be more sensitive, and more creative in their search for high-quality lives	• Nondirective teaching • concepts of self • exploration of feelings
Behavioral family	models that emphasize students' development of new and more appropriate behaviors	• mastery learning • programmed instruction • direct instruction • simulations • traditional model

Adapted from Joyce, B., & Weil, M. (1996). Models of teaching (5th ed.). Boston: Allyn and Bacon.

APPENDIX B

MULTIDIMENSIONAL-MULTIATTRIBUTIONAL CAUSALITY SCALE

(developed by Lefcourt, Von Baeyer, Ware, & Cox, 1979)

0- disagree, strongly
1- disagree, but only moderately
2- have no opinion
3- agree, but with some reservations
4- agree, strongly

1. When I receive a poor grade, I usually feel that the main reason is that I haven't studied enough for that course.

2. My enjoyment of a social occasion is almost entirely dependent on the personalities of the other people who are there.

3. If I were to receive low marks, it would cause me to question my academic ability.

4. Making friends is a funny business; sometimes I have to chalk up my successes to luck.

5. If I did not get along with others, it would tell me that I hadn't put much effort into the pursuit of social goals.

6. Sometimes when I get a good grade in a course, it is due to the teacher's easy grading scale.

7. It seems to me that if people don't like me, it is a sign of my ignorance in interpersonal relationships.

8. Sometimes my success on exams depends on some luck.

9. In my case, the good grades I receive are always the direct result of my efforts.

10. No matter what I do, some people just don't like me.

11. The most important ingredient in getting good grades is my academic ability.

12. Often chance events can play a large part in causing rifts between friends.

13. Maintaining friendships requires real effort to make them work.

14. In my experience, once a professor gets the idea you are a poor student, your work is much more likely to receive poor grades unless someone else hands it in for you.

15. It seems to me that getting along with people is a skill.

0- disagree, strongly
1- disagree, but only moderately
2- have no opinion
3- agree, but with some reservations
4- agree, strongly

16. Some of my lower grades have seemed to be partially due to bad breaks.

17. When I fail to do as well as expected in school, it is often due to a lack of effort on my part.

18. Some people can make me have a good time even when I don't feel sociable.

19. If I were to fail a course, it would probably be because I lacked skill in that area.

20. In my experience, making friends is largely a matter of having the right breaks.

21. When I hear of a divorce, I suspect that the couple probably did not try hard enough to make their marriage work.

22. Some of my good grades may simply reflect that these courses were easier than most.

23. I feel that people who are often lonely are lacking in social competence.

24. I feel that some of my grades depend to a considerable extent on chance factors such as having the right questions show up on an exam.

25. Whenever I receive good grades, it is always because I have studied hard for that course.

26. Some people just seem predisposed to dislike me.

27. I feel that my good grades reflect directly on my academic ability.

28. I find that the absence of friendships is often a matter of not being lucky enough to meet the right people.

29. In my case, success at making friends depends on how hard I work at it.

30. Often my poorer grades are obtained in courses that the professor has failed to make interesting.

31. Having good friends is simply a matter of one's social skills.

32. My academic low points sometimes make me think I was just unlucky.

33. Poor grades inform me that I haven't worked hard enough.

0- disagree, strongly
1- disagree, but only moderately
2- have no opinion
3- agree, but with some reservations
4- agree, strongly

34. To enjoy myself at a party, I have to be surrounded by people who know how to have a good time.

35. If I were to get poor grades, I would assume that I lacked ability to succeed in those courses.

36. If my marriage were to be a long and happy one, I would say that I must just be lucky.

37. In my experience, loneliness comes from not trying to be friendly.

38. Sometimes I get good grades only because the course material was easy to learn.

39. In my experience, there is a direct connection between the absence of friendship and being socially inept.

40. Sometimes I feel that I have to consider myself lucky for the good grades I get.

41. I can overcome all obstacles in the path of academic success if I worked hard enough.

42. It is almost impossible to figure out how I have displeased some people.

43. When I get good grades, it is because of my academic competence.

44. Difficulties with my friends often start with chance remarks.

45. If my marriage were to succeed, it would have to be because I worked at it.

46. Some low grades I have received seem to reflect the fact that some teachers are just stingy with grades.

47. It is impossible for me to maintain close relations with people without my tact and patience.

48. Some of my bad grades may have been a function of bad luck, being in the wrong course at the wrong time.

APPENDIX C

LEARNING STYLE JOURNAL

NOISE LEVEL- consider whether you prefer quiet or some noise when studying or learning new material.

LIGHT- describe your preference for bright or dim light while studying.

TEMPERATURE- describe your preference for room temperature when studying or learning new material.

DESIGN- this is your preference for formal or informal learning situations. For example, do you concentrate better when you are sitting at a desk or laying on your bed.

ALONE/ PEERS- describe your preference for working alone or with class mates. Consider whether your preference changes depending on the subject.

AUDITORY- while listening to a lecture and then reading your notes, consider your preference for learning new information by hearing it.

VISUAL- describe your preference for learning information by seeing it (e.g., overheads, videos, slides, diagrams, graphs, etc.)

TACTILE- describe your preference for touching and feeling when learning (e.g., working with models, building diagrams or structures).

KINESTHETIC- examine your preference for learning things by acting them out or moving around.

INTAKE- describe your preference for snacking, chewing on, or drinking something while studying.

TIME OF DAY- what time of day do you study best? Explain why you prefer to study at this time?

LATE MORNING- describe your level of concentration when studying between 10 AM and noon.

AFTERNOON- describe your preference for studying in the afternoon (between 12 noon and 5 PM). Think about your concentration.

MOBILITY- describe whether moving around while learning helps you concentrate or serves as a distraction.

APPENDIX D

PRE-PEPS GRID

What do you know about your style?

20 30 40 50 60 70 80

1	prefers quiet	noise level	prefers sound	1
2	prefers dim	light	prefers bright	2
3	prefers cool	temperature	prefers warm	3
4	prefers informal	design	prefers formal	4
5	low	motivation	high	5
6	low	persistent	high	6
7	low	responsibility	high	7
8	does not like	structure	wants	8
9	prefers alone	alone/ peers	prefers with peers	9
10	does not want present	authority figures	wants present	10
11	does not learn in	several ways	prefers variety	11
12	does not prefer	auditory	prefers	12
13	does not prefer	visual	prefers	13
14	does not prefer	tactile	prefers	14
15	does not prefer	kinesthetic	prefers	15
16	does not prefer	intake	prefers	16
17	prefers evening	time of day	prefers morning	17
18	does not prefer	late morning	prefers	18
19	does not prefer	afternoon	prefers	19
20	does not prefer	mobility	prefers	20

20 30 40 50 60 70 80

Listed above are the 20 elements of your learning style. A brief description of each element is provided on the back of this sheet. Understanding your preference for these elements can help you improve your concentration while completing academic or work related activities. Experiment with each of these elements and place an "X" where you feel it is appropriate.

Adopted from Price, G.E. (1996). Productivity Environmental Preference Survey (PEPS) Manual. Price Systems, Inc., Lawrence, KS.

APPENDIX E

PRODUCTIVITY ENVIRONMENTAL PREFERENCE SURVEY (PEPS)

PRODUCTIVITY ENVIRONMENTAL PREFERENCE SURVEY Dunn, Dunn and Price

FORM #8

Major or Occupation PRINT INSIDE BOXED IN AREA ONLY

NAME
LAST NAME FIRST

GRADE OR EDUCATION
(6) (8) 10 11 12 13 14 15 16 16+

Copyright © 1986, 1990, 1991, 1993, 1996 Price Systems, Inc.

USE A NO. 2 PENCIL, DO NOT FOLD OR STAPLE

DO NOT MARK HERE

SEX FEMALE ○ MALE ○

BIRTHDAY
YEAR MONTH

SPECIAL CODES

IDENTIFICATION NUMBER

Write your name, sex, and birthdate in the space provided.
Blacken the bubbles below each of the boxes you filled out.

Read each statement and decide to what extent you would agree or disagree with that statement if you had new or difficult to learn. Mark (SD), if you strongly disagree, or (D), disagree, or (U), uncertain, or (A), agree, or (SA), strongly agree, as the response that best describes how you feel most of the time. Give your immediate or first reaction to each question. Please answer all the questions on both sides of form.

1. I prefer working in bright light. SD D U A SA
2. I like to work alone. SD D U A SA
3. It is easy for me to concentrate late at night. SD D U A SA
4. I like to draw or use diagrams when I work. SD D U A SA
5. I often have to be reminded to complete certain tasks or assignments. SD D U A SA
6. The one job I like doing best, I like to do with an expert in the field. SD D U A SA
7. I can think better lying down than sitting. SD D U A SA
8. I prefer cool temperatures when I need to concentrate. SD D U A SA
9. I like to block out noise or sound when I work. SD D U A SA
10. People keep reminding me to complete my work. SD D U A SA
11. It is difficult for me to concentrate when I am warm. SD D U A SA
12. The one job I like doing best, I do with two or more people. SD D U A SA
13. I prefer to work or read where the lights are shaded. SD D U A SA
14. When I concentrate I like to sit on a soft chair or couch. SD D U A SA
15. I usually finish what I start. SD D U A SA
16. The things I remember best are the things that I hear. SD D U A SA
17. I enjoy tasks that allow me to take breaks. SD D U A SA
18. I can work more effectively in the afternoon than in the morning. SD D U A SA
19. I like to "snack" when I'm concentrating. SD D U A SA
20. When I have a lot of work to do I like to work with several colleagues. SD D U A SA
21. Noise or extraneous sound usually keeps me from concentrating. SD D U A SA
22. I often forget to do the things I've said I would do. SD D U A SA
23. I take lots of notes in a lecture, to help me remember. SD D U A SA
24. I like to work or analyze an assignment with another individual. SD D U A SA
25. I prefer cool temperatures when I'm working. SD D U A SA
26. The one job I like doing best, I do with several people. SD D U A SA
27. I concentrate best in the late afternoon. SD D U A SA
28. The things I remember best are the things that I read. SD D U A SA
29. I usually complete tasks that I start. SD D U A SA
30. I can concentrate better when I sit up rather than when I recline. SD D U A SA
31. I like to learn or work with a person in authority. SD D U A SA
32. I work best early in the morning. SD D U A SA
33. I get a lot done when I work on my own. SD D U A SA
34. When I work I turn all the lights on. SD D U A SA
35. I prefer that others share responsibility for a task we're doing. SD D U A SA
36. I really enjoy television. SD D U A SA
37. I like either a teacher or supervisor to outline tasks I have to complete. SD D U A SA
38. I like to sit on a straight-back chair when I concentrate. SD D U A SA
39. I work or study best by myself. SD D U A SA
40. I can remember things best when I study them in the evening. SD D U A SA
41. I remember best the things I read in a book or magazine. SD D U A SA
42. I always finish tasks that I start. SD D U A SA
43. If I have to learn something new, I prefer to learn about it by hearing a record, tape or lecture. SD D U A SA
44. I am most alert in the evening. SD D U A SA

5. The one job I like doing best, I do with a group of people. .... SD D U A SA
6. I am uncomfortable when I work or try to study in a warm room. .... SD D U A SA
7. I prefer to have teachers or supervisors set deadlines for my work. .... SD D U A SA
8. I like to eat while I'm concentrating. .... SD D U A SA
9. I prefer completing one thing before I start something else. .... SD D U A SA
0. It is difficult for me to start a new task before I finish the task I am doing. .... SD D U A SA
1. I really enjoy movies. .... SD D U A SA
2. I have to be reminded to do things I've said I would do. .... SD D U A SA
3. I work best when the lights are shaded. .... SD D U A SA
4. I prefer that persons in authority stay away until I have completed my work. .... SD D U A SA
5. I keep trying to accomplish a task even if it appears that I may not succeed. .... SD D U A SA
6. I like to learn about something new by hearing a tape or a lecture. .... SD D U A SA
7. I feel I am self-motivated. .... SD D U A SA
8. The one job I like doing best, I prefer doing alone. .... SD D U A SA
9. Eating something would distract me when I'm working. .... SD D U A SA
0. My performance improves if I know my work will be checked. .... SD D U A SA
1. I prefer to work with music playing. .... SD D U A SA
2. I stay at a task until it is finished, even if I don't like what has to be done. .... SD D U A SA
3. I learn best by being directly involved in what I am doing. .... SD D U A SA
4. I always do the best I can. .... SD D U A SA
5. I prefer to learn how to do a new task by actually doing it. .... SD D U A SA
6. I often read in dim light. .... SD D U A SA
7. If I have to learn something new, I like to learn about it by reading. .... SD D U A SA
8. I prefer someone else carefully outline how a task should be done. .... SD D U A SA
9. I would rather start work in the morning than in the evening. .... SD D U A SA
0. I constantly change positions in my chair. .... SD D U A SA
1. The things I remember best are the things that I hear. .... SD D U A SA
2. I like my instructor(s) or supervisor(s) to recognize my efforts. .... SD D U A SA
3. I learn better by reading than by listening to someone. .... SD D U A SA
4. I get more done in the afternoon than in the morning. .... SD D U A SA
5. I can block out most sound when I work. .... SD D U A SA
6. I really like to build things. .... SD D U A SA
7. I prefer to work under a shaded lamp with the rest of the room dim. .... SD D U A SA
8. I choose to eat, drink or chew only after I finish working. .... SD D U A SA
9. I remember things better when I study in the evening. .... SD D U A SA
0. If I have to learn something new, I like to learn about it by seeing a movie. .... SD D U A SA
. I feel good when my spouse, colleague or supervisor praises me for doing well at my job. .... SD D U A SA
. I prefer a cool environment when I try to study. .... SD D U A SA
. It's difficult for me to block out sound (music, T.V., talking) when I work. .... SD D U A SA
. I would rather learn by experience than by reading. .... SD D U A SA
. I like being praised for a "job well done." .... SD D U A SA
. It's difficult for me to sit in one place for a long time. .... SD D U A SA
. I like to have something to drink when I work. .... SD D U A SA
. I enjoy doing experiments. .... SD D U A SA
. If a task becomes very difficult, I tend to lose interest in it. .... SD D U A SA
. I like to learn new things. .... SD D U A SA
. I can sit in one place for a long time. .... SD D U A SA
. I can concentrate best in the evening. .... SD D U A SA
I prefer to study with someone who really knows the material. .... SD D U A SA
I often change my position when I work. .... SD D U A SA
I would work more effectively if I could eat while I'm working. .... SD D U A SA
If I can go through each step of a task, I always remember what I learn. .... SD D U A SA
I learn better when I read the instructions than when someone tells me what to do. .... SD D U A SA
I only begin to feel wide awake after 10:00 A.M. .... SD D U A SA
I often complete unfinished work on a bed or couch where I can recline. .... SD D U A SA
. I often wear a sweater or jacket indoors. .... SD D U A SA

STOP

APPENDIX F

DAN'S PEPS RESULTS

- PRODUCTIVITY ENVIRONMENTAL PREFERENCE SURVEY -

DATE: 03-16-1998 **INDIVIDUAL PROFILE** **GROUP NO.:** 999

NAME: DA **SEX:** M **GRADE:** **BIRTHDATE:** / YR MO

GROUP IDENTIFICATION: DALLAS TX D **SPECIAL CODE:** **ID. NO.:**

SCALES

CORE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
RAW	15	26	16	15	20	17	25	9	21	11	16	15	24	13	15	27	17	7	12	13
STD.	52	59	50	46	49	50	48	54	52	47	55	61	59	51	50	61	39	40	67	45

PREFERENCE SUMMARY

20 30 40 50 60 70 80

	20–40	40–60	60–80	
1	Prefers Quiet	Noise Level	Prefers Sound	1
2	Prefers Dim	Light -*-	Prefers Bright	2
3	Prefers Cool	Temperature	Prefers Warm	3
4	Prefers Informal	-*Design	Prefers Formal	4
5	Low	Motivation	High	5
6	Low	Persistent	High	6
7	Low	Responsible(Conforming)	High	7
8	Does not Like	Structure*-	Wants	8
9	Prefers Alone	Alone/Peers	Prefers with Peers	9
10	Does not want Present	Authority Figures	Wants Present	10
11	Does not Learn in	Several Ways*-	Prefers Variety	11
12	Does not prefer	Auditory -	*- Prefers	12
13	Does not prefer	Visual -*-	Prefers	13
14	Does not prefer	Tactile	Prefers	14
15	Does not prefer	Kinesthetic	Prefers	15
16	Does not prefer	Intake -	*- Prefers	16
17	Prefers Evening -*	- Time of Day	Prefers Morning	17
18	Does not prefer -	*- Late Morning	Prefers	18
19	Does not prefer	Afternoon	-*Prefers	19
20	Does not prefer	-*Mobility	Prefers	20

20 30 40 50 60 70 80

PROFILE NO.: 2

Copyright 1982,1987,1990,1993 - Price Systems,Inc., Box 1818, Lawrence, Ks. 66044-1818 - Phone 785-843-7892

APPENDIX G

JEN'S PEPS RESULTS

- PRODUCTIVITY ENVIRONMENTAL PREFERENCE SURVEY -

DATE: 03-16-1998 **INDIVIDUAL PROFILE** **GROUP NO.:** 999

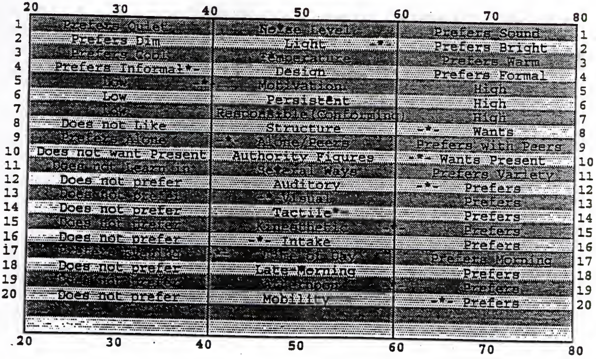
NAME: JEN **SEX:** F **GRADE:** **BIRTHDATE:** 79/01 YR MO

GROUP IDENTIFICATION: DALLAS TX D **SPECIAL CODE:** **ID. NO.:**

SCALES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
CORE																				
RAW	12	25	14	11	16	18	24	12	15	16	14	16	18	14	19	17	19	9	10	23
STD.	47	58	46	37	39	53	46	64	42	63	47	64	46	54	60	45	41	50	60	65

PREFERENCE SUMMARY



	20 – 40	40 – 60	60 – 80	
1	Prefers Quiet	Noise Level	Prefers Sound	1
2	Prefers Dim	Light -*-	Prefers Bright	2
3	Prefers Cool	Temperature	Prefers Warm	3
4	Prefers Informal*-	Design	Prefers Formal	4
5	Low -*	Motivation	High	5
6	Low	Persistent	High	6
7	Low	Responsible (Conforming)	High	7
8	Does not Like	Structure	-*- Wants	8
9	Prefers Alone	-* Alone/Peers	Prefers with Peers	9
10	Does not want Present	Authority Figures	-*- Wants Present	10
11	Does not Learn in	Several Ways	Prefers Variety	11
12	Does not prefer	Auditory	-*- Prefers	12
13	Does not prefer	-* Visual	Prefers	13
14	Does not prefer	Tactile*-	Prefers	14
15	Does not prefer	Kinesthetic -*-	Prefers	15
16	Does not prefer	-*- Intake	Prefers	16
17	[illegible]	Time of Day	Prefers Morning	17
18	Does not prefer	Late Morning	Prefers	18
19	Does not prefer	Afternoon	Prefers	19
20	Does not prefer	Mobility	-*- Prefers	20

PROFILE NO.: 1

Copyright 1982,1987,1990,1993 - Price Systems,Inc., Box 1818, Lawrence, Ks. 66044-1818 - Phone 785-843-7892

APPENDIX H

MIKE'S PEPS RESULTS

- PRODUCTIVITY ENVIRONMENTAL PREFERENCE SURVEY -

DATE: 03-16-1998 **INDIVIDUAL PROFILE** **GROUP NO.:** 999

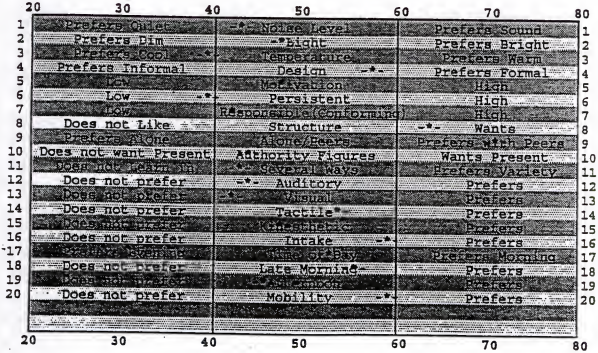
NAME: MI **SEX:** M **GRADE:** **BIRTHDATE:** /
YR MO

GROUP IDENTIFICATION: DALLAS TX D **SPECIAL CODE:** **ID. NO.:**

SCALES

ORE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AW	10	19	10	20	19	13	22	12	32	10	13	9	16	14	14	26	28	10	6	20
TD.	43	47	39	57	47	39	42	64	71	44	43	44	42	54	47	59	53	55	45	59

PREFERENCE SUMMARY



PROFILE NO.: 3

Copyright 1982,1987,1990,1993 - Price Systems,Inc., Box 1818, Lawrence, Ks. 66044-1818 - Phone 785-843-7892

APPENDIX I

PAT'S PEPS RESULTS

- PRODUCTIVITY ENVIRONMENTAL PREFERENCE SURVEY -

DATE: 03-26-1998 **INDIVIDUAL PROFILE** **GROUP NO.:** 999

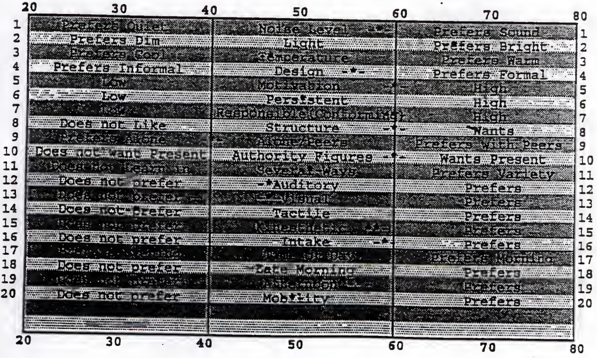
NAME: PAT **SEX:** F **GRADE:** **BIRTHDATE:** /
YR MO

GROUP IDENTIFICATION: DALLAS TX B **SPECIAL CODE:** **ID. NO.:**

SCALES

ORE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AW	18	30	14	19	24	17	31	11	14	15	15	10	18	7	18	26	11	8	9	15
TD.	58	66	46	55	60	50	60	60	40	60	51	46	46	32	58	59	31	45	56	49

PREFERENCE SUMMARY



	20 – 40	40 – 60	60 – 80	
1	Prefers Quiet	Noise Level -*-	Prefers Sound	1
2	Prefers Dim	Light	Prefers Bright	2
3	Prefers Cool	*emperature	Prefers Warm	3
4	Prefers Informal	Design -*-	Prefers Formal	4
5	Low	Motivation -*-	High	5
6	Low	Persistent	High	6
7	Low	Responsible(Conforming)	High	7
8	Does not Like	Structure -*-	Wants	8
9	Prefers Alone	Alone/Peers	Prefers with Peers	9
10	Does not Want Present	Authority Figures -*-	Wants Present	10
11	Does not Learn in	Several*Ways	Prefers Variety	11
12	Does not prefer	-*Auditory	Prefers	12
13	Does not prefer	-*-Visual	Prefers	13
14	Does not prefer	Tactile	Prefers	14
15	Does not prefer	Kinesthetic -*-	Prefers	15
16	Does not prefer	Intake -*	Prefers	16
17	[illegible]	[illegible]	Prefers Morning	17
18	Does not prefer	Late Morning	Prefers	18
19	[illegible]	Afternoon	Prefers	19
20	Does not prefer	Mobility	Prefers	20

PROFILE NO.: 1

Copyright 1982,1987,1990,1993 - Price Systems,Inc., Box 1818, Lawrence, Ks. 66044-1818 - Phone 785-843-7892

APPENDIX J

TONY'S PEPS RESULTS

- PRODUCTIVITY ENVIRONMENTAL PREFERENCE SURVEY -

DATE: 04-10-1998 **INDIVIDUAL PROFILE** **GROUP NO.:** 999

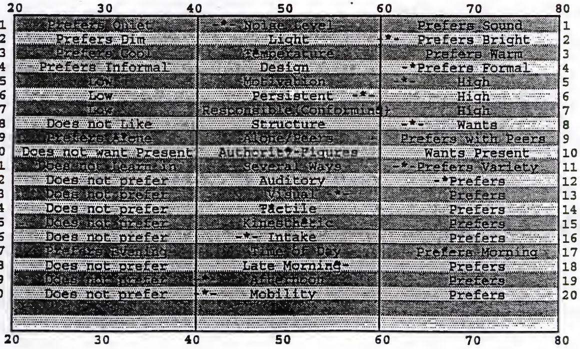
NAME: ANTHONY **SEX:** M **GRADE:** **BIRTHDATE:** YR MO

GROUP IDENTIFICATION: DALLAS TX F **SPECIAL CODE:** **ID. NO.:**

SCALES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
CORE																				
RAW	10	27	14	23	25	20	31	12	9	12	18	17	22	12	16	17	38	10	5	11
STD.	43	61	46	64	63	58	60	64	32	50	63	67	55	48	52	45	67	55	41	41

PREFERENCE SUMMARY



	20 – 40	40 – 60	60 – 80	
1	Prefers Quiet	-*- Noise Level	Prefers Sound	1
2	Prefers Dim	Light	-*- Prefers Bright	2
3	Prefers Cool	*emperature	Prefers Warm	3
4	Prefers Informal	Design	-*Prefers Formal	4
5	Low	Motivation	-*- High	5
6	Low	Persistent -*-	High	6
7	Low	Responsible(Conformin*	-) High	7
8	Does not Like	Structure	-*- Wants	8
9	Prefers Alone	Alone/Peers *	Prefers with Peers	9
10	Does not want Present	Authority*-Figures	Wants Present	10
11	Does not Learn in	Several Ways	-*-Prefers Variety	11
12	Does not prefer	Auditory	-*Prefers	12
13	Does not prefer	Visual -*-	Prefers	13
14	Does not prefer	T*ctile	Prefers	14
15	Does not prefer	Kinesth*tic	Prefers	15
16	Does not prefer	-*- Intake	Prefers	16
17	Prefers Evening	Time of Day	Prefers Morning	17
18	Does not prefer	Late Mornin*-	Prefers	18
19	Does not prefer	*- Afternoon	Prefers	19
20	Does not prefer	-*- Mobility	Prefers	20

PROFILE NO.: 1

Copyright 1982,1987,1990,1993 - Price Systems,Inc., Box 1818, Lawrence, Ks. 66044-1818 - Phone 785-843-7892

REFERENCES

Abrams, H.G., & Jernigan, L.P. (1984). Academic support services and the success of high-risk college students. American Educational Research Journal, 21, 2, 261-274.

American College Testing Program (1996). Building better study skills: Practical methods for succeeding in college. Iowa City, IA; ACT Publishing.

Andrews, J.D (1981). Teaching format and student style: Their interactive effects on learning. Research in Higher Education, 14(2), 161-78.

Astin, A. (1975). Preventing students from dropping out. San Francisco: Jossey-Bass.

Balajthy, E., & Weisberg, W. (1990). Transfer effects of prior knowledge and use of graphic organizers on college developmental reader's summarization and comprehension of expository text. Yearbook of the National Reading Conference, 39, 339-345.

Borg, W.R., & Gall, M.D. (1983). Educational Research: An introduction, (3rd ed.). New York: Longman.

Clark-Thayer, S. (1987). The relationship of the knowledge of student-perceived learning style preferences, and study habits and attitudes to achievement of college freshman in a small urban university. (Doctoral dissertation, Boston University, 1987). Dissertation Abstracts International, 48, 872A.

Claxton, C.S., & Murrell, P.H. (1987). Learning styles: Implications for improving educational practices. ASHE-ERIC Higher Education Report No. 4.

Cone, A. L. (1991). Sophomore academic retention associated with freshman study skills and college adjustment course. Psychological Reports, 69, 1, 312-314.

Cone, A. L., & Owens, S. K. (1991). Academic and locus of control enhancement in a freshman study skills and college adjustment course. Psychological Reports, 68, 1211-1217.

Conti, G. J., & Welborn, R. B. (1986). Teaching-learning styles and the adult learner. Life Long Learning, 9, 8, 20-24.

Cornett, C. E. (1983). What you should know about teaching and learning styles. Phi Delta Kappa Educational Foundation: Bloomington, IN.

Crandall, V.J., Katkovsky, W., & Preston, A., (1962). Motivation and ability determinants of young children's intellectual achievement behaviors. Child Development, 33, 643-661.

Deboer, G. E. (1983). The importance of freshman students' perceptions of the factors responsible for first-term academic performance. Journal of College Student Personnel, 344-349.

Dixon, N. M. (1985). The implementation of learning style information. Lifelong Learning, 9(3), 16-18, 26.

Dorsey, O. L., & Pierson, M. J. (1984). A descriptive style of adult learning styles in a nontraditional education program. Lifelong Learning, 7(8), 8-11.

Doyle, W., & Rutherford, B. (1984). Classroom research on matching learning and teaching styles. Theory Into Practice, 23, 1, 20-25.

Dunn, C. (1995). A comparison of three groups of academically at-risk college students. Journal of College Student Development, 36,3, 270-279.

Dunn, R., & Deckinger, E. L. (1990). Should college students be taught how to do homework? Illinois School Research and Development, 26(3), 96-113.

Dunn, R., Dunn, K., & Price, G.E. (1996). Productivity Environmental Preference Survey. Lawrence, KS: Price Systems.

Dunston, P.J., & Ridgeway, V. G. (1990). The effect of graphic organizers on learning and remembering information from connected discourse. Forum for Reading, 22, 15-23.

El-Hindi, A.E., & Childers, K.D. (1996). Exploring metacognitive awareness and perceived attributions for academic success and failure: A study of at-risk college students. Paper presented at the Annual Meeting of the Southwest Educational Research Association. New Orleans, LA.

Elliott, T. R., Godshall, F., Shrout, J. R., & Witty, T. E. (1990). Journal of Counseling Psychology, 37(2), 203-207.

Fleming, N. D. & Mills, C. (1992). Not another inventory, rather a catalyst for reflection. To Improve the Academy, 11, 137-155.

Fraenkel, J. R., & Wallen, N. E. (1996). How to design and evaluate research in education (3rd ed.). New York: McGraw-Hill.

Glesne, C., & Peshkin, A. (1992). Becoming qualitative researchers: An introduction. New York: Longman.

Gordon, W. (1992). Handbook of academic advising. Westport, CT: Greenwood Press.

Griggs, S.A. (1991). Learning styles counseling. Ann Arbor, MI: ERIC Clearinghouse on Counseling and Personnel Services. (ERIC Document Reproduction Services No. ED 375 738)

Grimes, S. K. (1995). Targeting academic programs to student diversity utilizing learning styles and learning-study strategies. Journal of College Student Development, 36(5), 422-30.

Gunter, M. A., Estes, T. H., & Schwab, J. H. (1990). Instruction: A models approach. Boston: Allyn & Bacon.

Hannafin, K. M. (1991). Technology and the support of at-risk students. Journal of General Education, 40, 163-179.

Haslam, W.L., & Brown, W.F. (1968). Effectiveness of study-skills instruction for high school sophomores. Journal of Educational Psychology, 59,(4), 223-226.

Hodgkinson, H. L. (1983). Guess who's coming to college: A demographic portrait of students in the 1990s. Academe, 69(2), 13-20.

Jacobsen, D., Eggen, P., & Kauchak, D. (1989). Methods for teaching: A skills approach (3rd ed.). Columbus, OH: Merrill.

Joyce, B., & Weil, M. (1996). Models of teaching (5th ed.). Boston: Allyn and Bacon.

Kanoy, K. W., & Wester, J. (1989). Predicting college success of freshman using traditional, cognitive, and psychological measures. Journal of Research and Development in Education, 22, 3, 65-70.

Keefe, J.W. (1982). Assessing student learning styles: An overview. Student Learning Styles and Brain Behavior. 1904 Association Drive, Reston, VA: National Association of Secondary School Principles.

King, A. (1992). Comparison of self-questioning, summarizing, and notetaking-review as strategies for learning from lectures. American Educational Research Journal, 29, 303-323.

Kolb, D.A. (1984). Experiential learning: Experience as a source of learning and development. Englewood Cliffs, NJ: Prentice-Hall.

Korhonen, L. J., & McCall, R.J. (1986). The interaction of learning style and learning environment on adult achievement. Lifelong Learning, 10(2), 21-23.

Kozma, R. B., Belle, L.W., & Williams, G. W. (1978). Instructional techniques in higher education. New York: Educational Technology Publications.

Kulik, C.C., Kulik, J. A., & Shwalb, B. J. (1983). College programs for high-risk and disadvantaged students: A meta-analysis of findings. Review of Educational Research, 53, 3, 397-414.

Larose, S., & Roy, R. (1991). The role of prior academic performance and nonacademic attributes in the prediction of the success of high-risk college students. Journal of College Student Development, 32, 171-176.

Lefcourt, H. M. (1981). Research with the locus of control construct: Volume 1. New York: Academic Press.

Lefcourt, H. M., Van Baeyer, C.L., Ware, E.E., & Cox, D.J. (1979). The multidimensional-Multiattributional Causality Scale. Canadian Journal of Behavioral Sciences, 11, 286-304.

McCaig, K. A. (1993). Collaborative enhancement strategies for academically at-risk first-year students. College Student Affairs Journal, 13, 1, 58-64.

Merriam, S.B. (1998). Qualitative research and case study applications in education. San Francisco: Jossey-Bass.

Meyer, J. H. F., Cliff, A. F., & Dunne, T. T. (1994). Impressions of disadvantage: II-monitoring and assisting the student at risk. Higher Education, 27, 97-117.

Mickler, M. L., & Zippert, C. P. (1987). Teaching strategies based on learning styles of adult students. Community/ Junior College Quarterly, 11, 33-37.

Miles, M.B., & Huberman, A.M. (1994). Qualitative data analysis: An expanded sourcebook. Thousand Oaks, CA: Sage.

Miller, C.D., Alway, M., & McKinely, D. L. (1987). Effects of learning styles and strategies on academic success. Journal of College Student Personnel, 28(5), 399-404.

National Center for Education Statistics (NCES) (1996). The condition of Education 1996. Washington, DC: US Department of Educational Research and Development.

Nelson, B., Dunn, R., Griggs, S. A., Primavera, L., Fitzpatrick, M., Bacilious, Z., and Miller, R. (1993). Effects of learning style intervention on college students' retention and achievement. Journal of College Student Development, 34, 364-369.

Nisbet, J., Ruble, V. E., & Schurr, K. T. (1982). Predictors of academic success with high risk college students. Journal of College Student Personnel, 23, 227-235.

Nist, S. L., Mealey, D. L., Simpson, M. L., & Kroc, Richard (1990). Measuring the affective and cognitive growth of regularly admitted and developmental studies students using the learning and study strategies inventory (LASSI). Reading Research and Instruction, 30, 1, 44-49.

Nist, S. L., Simpson, M. L., Olejnik, S., & Mealey, D. L. (1991). The relation between self-selected study processes and test performance. American Educational Research Journal, 28, 849-874.

Noel, L., Levitz, R., & Saluri, D. (1985). Increasing student retention. San Francisco: Jossey-Bass Publishers.

O'Brien, P. T., & Thompson, M. J. (1994). Cognitive styles and academic achievement in community college education. Community College Journal of Research and Practice, 18, 547-556.

Ornstein, A. C., & Hunkins, F. (1993). Curriculum foundations, principles, and theory (2nd ed.). Boston: Allyn and Bacon.

Pascarella, E. T. (1982). Studying student attrition. New Directions for Institutional Research, 36. San Francisco: Jossey-Bass.

Pascarella, E. T., Edison, M., Hagedorn, L. S., Nora, A., & Terenzini, P. T. (1996). Influences on students' internal locus of attribution for academic success in the first year of college. Research in Higher Education, 37, 6, 731-756.

Pacarella, E. T., & Terenzini, P. T. (1991). How college affects students: Findings and insights from twenty years of research. San Francisco: Jossey-Bass.

Perry, R. P., Hechter, F. J., Menec, V. H., & Weinberg, L. E. (1993). Enhancing achievement motivation and performance in college students: An attributional retraining perspective. Research in Higher Education, 34, 6, 687-723

Peterson, P., Marx, R., & Clark, C. (1978). Teacher planning, teacher behavior, and student achievement. American Educational Research Journal, 15, 417-432.

Peterson, S. E. (1992). The cognitive functions of underling as a study technique. Reading Research and Instruction, 31, 49-56.

Price, G. E. (1996). Productivity environmental preference survey manual. Lawrence, KS: Price Systems.

Reglin, G. L. (1990). A model program for educating at-risk students. T.H.E. Journal, 65-67.

Robinson, J.P., Shaver, P.R., & Wrightsman, L.S. (1981). Measures of Personality and Social Psychological Attitudes. Volume 1. San Diego: Academic Press.

Robyak, J. E., & Downey, R. G. (1979). The prediction of long-term academic performance after the completion of a study skills course. Measurement and Evaluation in Guidance, 12, 2, 108-111.

Rotter, J.B. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 80 (Whole No. 609).

Rotter, J.B. (1990). Internal versus external control of reinforcement: A case history of a variable. American Psychologist, 45, 4, 489-493.

Rotter, J.B. (1991). Generalized expectancies for internal versus external control of reinforcement. In J. B. Rotter (2nd ed.). The Development and Applications of Social Learning Theory. Boston: Praeger.

Roueche, J. E. & Roueche, S. D. (1994). Responding to the challenge of the at-risk student. Community College Journal of Research and Practice; 18(1), 1-11.

Ruddell, R. B., & Boyle, O. F. (1989). A study of cognitive mapping as a means to improve summarization and comprehension of expository text. Reading Research and Instruction, 29, 12-22.

Schumacker, R. E., Sayler, M., & Bembry, K. L. (1995). Identifying at-risk gifted students in an early college entrance program. Roeper Review, 18, 2, 126-129.

Sherman, T.M. (1985). Learning improvement programs: A review of controllable influences. Journal of Higher Education, 56, 1, 87-100.

Silverman, M. S. (1990). Study skills training for "high risk" freshman. Journal of College Student Personnel, 13, 63.

Simmons, G., Wallins, J., & George, A. (1995). The effects of a freshman seminar on at-risk under-, over-, and low achievers. NACADA Journal, 15, 1, 8-14.

Southern Methodist University (1997). Guidelines for undergraduate education. Dallas, TX: Southern Methodist University Office of Academic Advising.

Tarpey, E. A., & Harris, J. B. (1979). Study skills courses make a difference. Journal of College Student Personnel, 62-66.

Terenzini, P. T. (1993). The transition to college: Easing the passage, a summary of the research findings of the out-of-class experience program. State College, Pennsylvania: Pennsylvania State University, National Center on Post-secondary Teaching, Learning, and Assessment.

Tinto, V. (1987). Leaving college: Rethinking the causes and cures of student attrition. Chicago: University of Chicago Press.

Watkins, D. (1987). Academic locus of control: A relevant variable at tertiary level? Higher Education, 16, 221-229.

Weinstein, C. E. (1994). Students at risk for academic failure: Learning to learn classes. In K. W. Prichard & R. M. Sawyer (eds.). Handbook of college teaching: Theory and applications. Westport, CT: Greenwood Press.

Weinstein, C. E., Goetz, E. T., & Alexander, P.A. (1988). Learning and study strategies: Issues in assessment, instruction, and evaluation. San Diego, CA: Academic Press.

Weinstein, C. E., & Underwood, V. L. (1985). Learning strategies: The how of learning. In J.W. Segal, S.F. Chipman, & R. Glaser (Eds.), Thinking and learning skills, 1, 241-257.

White, T. J. & Sedlacek, W. E. (1986). Noncognitive predictors: Grades and retention of specially-admitted students. Journal of College Admissions, 20-23.

Wilhite, S. C. (1990). Self-efficacy, locus of control, self-assessment of memory ability, and study activities as predictors of college course achievement. Journal of Educational Psychology, 82, 4, 696-700.

Wratcher, M. A. (1991). Helping freshman to maximize their learning potential. Journal of College Student Development, 32, 380-381.

Yin, R. K. (1984). Case study research: Design and methods. Applied Social Research Methods Series Volume 5. Newbury Park: Sage.

Yin, R. K. (1994). Case study techniques: Design and methods (2nd ed.). Newbury Park, CA: Sage.

BIOGRAPHICAL SKETCH

Ainsley Carry was born in Bronx, New York on August 14, 1969, as the third of four sons to Mavis and Noel Carry. He attended public school in Brooklyn, New York until the fourth grade. The remainder of his public school education was completed in Miami, Florida. In high school he was a student athlete and earned letters in varsity football and track.

After graduating from Miami Norland Senior High in 1988, he continued his education at the University of Florida (UF). While at UF, he studied economics and played football. As a student athlete, he earned a Bachelor of Science with a major in economics. He was also a member of the 1990 football conference championship team. Upon graduation, he worked in retail sales for one year. Ainsley Carry returned to graduate school at UF in 1994. After earning a Master of Education with a major in Counselor Education in 1995, he enrolled in the doctoral program in Educational Leadership. In 1997, he accepted a position at Southern Methodist University.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Education.

Linda A. Behar-Horenstein
Linda Behar-Horenstein, Chair
Associate Professor of
Educational Leadership

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Education.

Robert R. Sherman
Robert Sherman
Professor of Foundations of
Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Education.

Paul George
Professor of Educational
Leadership

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Education.

Art Sandeen
Professor of Educational
Leadership

This dissertation was submitted to the Graduate Faculty of the College of Education and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Education.

December 1998

Roderick J McDavis
Dean, College of Education

Dean, Graduate School